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TENTH ANNUAL REPORT

PROCEEDINGS

Oregon State Horticultural Society

THIRTY-FIRST ANNUAL MEETING

ROSEBURG, OREGON

December 5, 6, 7, 1918





TENTH ANNUAL REPORT

PROCEEDINGS

OF THE

THIRTY-THIRD ANNUAL MEETING

OF THE

OREGON STATE

HORTICULTURAL SOCIETY

HELD DECEMBER 5, 6, 7, 1918

ROSEBURG, OREGON

ORGANIZED 1885

INCORPORATED 1901

Salem, Oregon:
The Pacific Homestead
1919

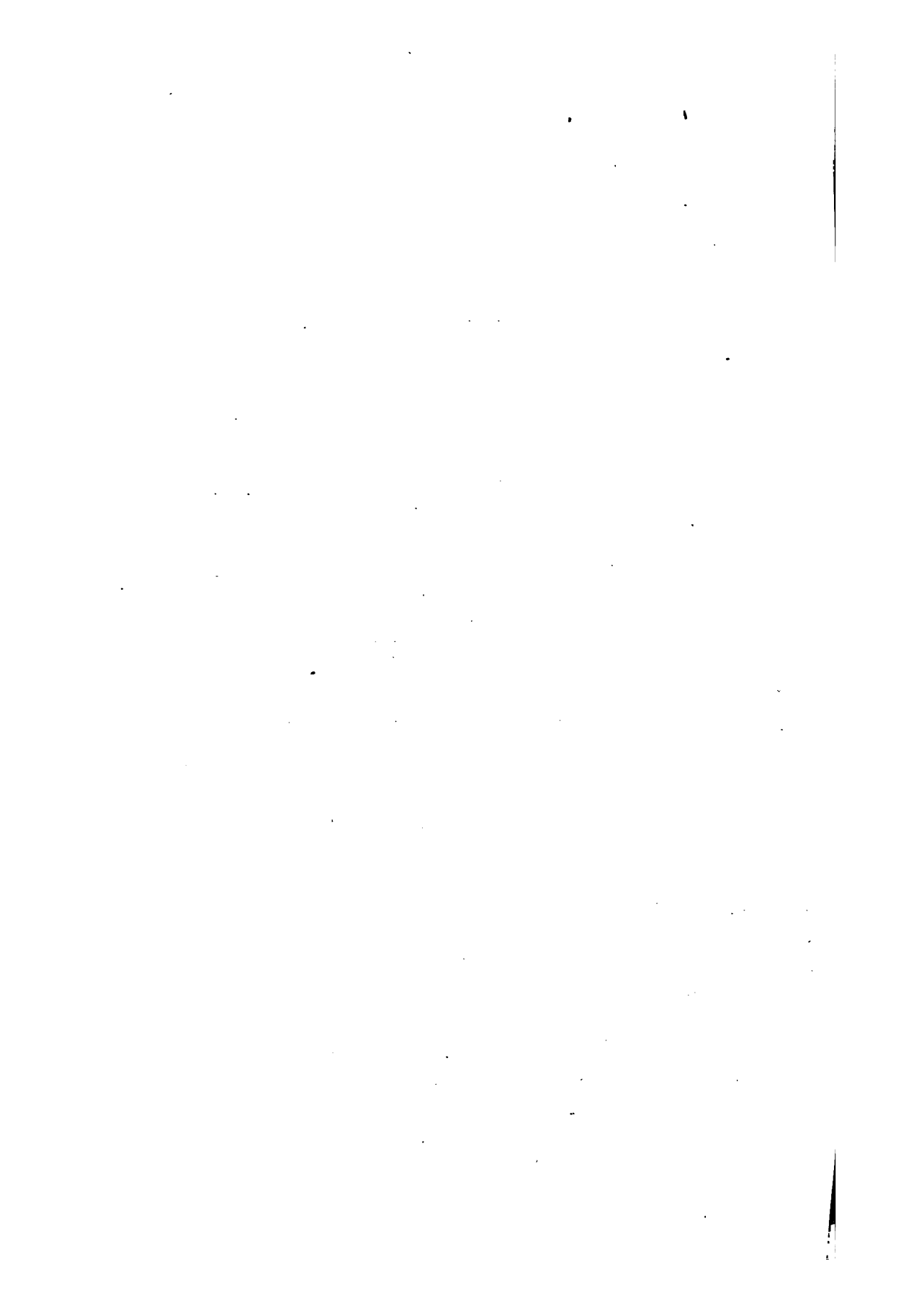
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Encl.
Ore. H. Lib.

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OREGON STATE HORTICULTURAL SOCIETY

Officers

BEN S. WORSLEY, President, Astoria
J. O. HOLT, Vice-President, Eugene
C. D. MINTON, Secretary-Treasurer, Portland

Board of Trustees

ALBERT BROWNELL, One Year, Portland
HENRY E. DOSCH, Two Years, Hillsdale
CHARLES L. McNARY, Three Years, Salem

Auditing Committee

ALBERT BROWNELL
C. A. BURT
J. B. PILKINGTON

Committee on Needed Legislation

ROBERT C. PAULUS, Salem
CHAS. A. PARK, Salem
DR. C. A. MACRUM, Mosier
BEN WORSLEY, Astoria
L. T. REYNOLDS, Salem

Honorary Members

Atwell, H. C. (1911), Forest Grove
Cardwell, Dr. J. R.* (1897), Portland
Dosch, Henry E (1911), Hillsdale, Portland
Lake, E. R. (1892), Pomological Dept.,
Washington, D. C.

Lambert, J. H.* (1895), Portland
Luelling, Seth* (1895), Milwaukie
Miller, H. B. (1911), 509 E. 21st St. N.,
Portland
Smith, E. L. (1911), Hood River
Starr, James E.* (1898), Portland
*Deceased.

Life Members

- Anderson, Nils P., McMinnville
 Armstrong, E. O., Salem
 Bateham, A. P., Portland
 Better Fruit Pub. Co., E. H. Shepard,
 Hood River
 Bridge Horticultural Society, Bridge, Coos
 County
 Brownell, Albert, Sargent Bldg., Portland
 Brumfield, J. T., Portland
 Bryant, Hub, Albany
 Carter, J. L., Hood River
 Central Horticultural Society, Coquille
 Chase, W. E., West Ave. and E. Burnside,
 Mt. Tabor, Portland
 Clark, L. E., Hood River
 Coos Bay Fruit Growers' Association,
 Marshfield
 Cordley, A. B., Dean, O. A. C., Corvallis
 Daugherty, Otis Ray, R. F. D. 1, Molla
 Davidson, Frank L., Hood River
 Davidson, P. S., Hood River
 Eggert, Mrs. Fred'k, 265 14th St., Port-
 land
 Esterly, H. M., Yeon Bldg., Portland
 Fanning, A. M., Sheridan
 Fargo, G. K., 83 Fifth St., Portland
 Forbis, John F., Dilley
 Goodrich, A. C., Yamhill
 Groner, Ferdinand, R. F. D. 2, Hillsboro
 Gale, H. E., Merlin
 Holaday, Asa, Scappoose
 Holt, J. O., Mgr. Eugene Fruit Growers'
 Association, Eugene
 Howe, Ed. L., Multnomah Hotel, Portland
 Laidlaw, W. A., 1515 Belmont St., Port-
 land
 McCargar, C. A., Yeon Bldg., Portland
 McDonald, M., Oregon Nursery Co., Orenco
 McGill, A., Beck Bldg., Portland
 McNary, U. S. Senator C. L., Salem
 Marcum, C. A., care Portland Hotel, Port-
 land
 Mason, Julius L., Hood River
 Meier, Julius L., care Meier & Frank,
 Portland
 Minton, C. D., Portland
 Moulton, L. D., McMinnville
 Myrtle Point Horticultural Society, Myrtle
 Point
 Newell, W. K., Portland
 Park, Chas. A., Salem
 Paulus, R. C., Salem
 Pemberton, John, Salem
 Pilkington, J. B., Portland
 Power, Frank W., Oregon Nursery Co.,
 Orenco
 Quarberg, A. A., Vancouver, Wash.
 Rees, J. H., Springbrook
 Reuter, Tillman, Madras
 Reynolds, L. T., Salem
 Roberts, E. C., Lebanon
 Rumbaugh, H. G., Albany
 Settlemeier, Frank W., Woodburn
 Deceased, 1914
 Swallow, C. W., R. F. D. 3, 118, Oregon
 City
 Wallace, F. W., McMinnville
 Weber, R. H., The Dalles
 Westerlund, J. A., Medford
 Williamson, H. M., Secretary State Board
 of Horticulture, Portland
 Deceased, 1917
 Williamson, W. E., Portland
 Deceased, 1917

Annual Members, 1919

- Arnoth, H. L., Newberg
 Armstrong, Harley, Freewater
 Astoria Chamber of Commerce, Astoria
 Barss, H. P., Corvallis
 Baker, W. B., 469 Everett St., Portland
 Bouquet, A. G. B., Corvallis
 Booth, J. H., Roseburg
 Brown, W. S., Corvallis
 Brown, O. V., Blind Slough, Astoria
 Bremner, Jas., Astoria
 Brunhall, W., Curtis
 Butterfield, I., Blind Slough, Astoria
 Butner, Foster, Roseburg
 Childs, Leroy, Hood River
 Chase, F. B., Eugene
 Clatsop Cranberry Association, Astoria
 Clarke, H. H., Central Point
 Covitch, Martin F., Astoria
 Cooley, S. D., Roseburg
 Cornelius, Judge Scott, Astoria
 Currin, C. J., Monroe
 Campbell, J. C., Sutherlin
 Dearborn, G. A., Dundee
 Duncan, Ewd., Route 3, Salem
 Ewing, A. R., Route 1, Box 25, Salem
 Eisman, F. D., Rogue River
 Eddy, B. L., Roseburg
 Fisher, Fred, Route 2, Roseburg
 Gallaher, S. M., Astoria
 Gill, R. W., Portland
 Goetling, O., Astoria
 Gray, E. E., Astoria
 Harvey, Joe., Roseburg
 Harlow, T. B., Eugene
 Hafley, H. R., Astoria
 Henderson, G. P., Roseburg
 Hune, C. J., Roseburg
 Hutchings, Ira, Brownsville
 Jessup, I. M., Cooks, Wash.
 Johnson, K. F., Route 1, Astoria
 Leahy, T. A., Astoria
 Lechner, H. J., Astoria
 Leenenweber, Frank, Astoria
 Lewis, C. I., Corvallis

Lewis, Jno. E., Roseburg
 Lily, D. G., Forest Grove
 Madison, W., Astoria
 Morton, H. F., Southerland
 Marsh, George, Lookingglass
 McGregor, W. F., Astoria
 Muller F. P., Milton
 Needham, Frank, Eugene
 Nelson, August, Astoria
 Parson, Reginald, Seattle, Wash.
 Peterson, O. I., Astoria
 Reith, John, Astoria
 Rosenberg, O. C., Astoria
 Russell, E. H., Wilber
 Scanbuong, Dr. L. A., Eugene
 Smith, W. G., Wolf River
 Spexarth, A. G., Astoria

Stansbery, J. E., Portland
 Stewart, O. E., Cottage Grove
 Stearns, A. F., Oakland
 Tols, Henry, Roseburg
 Thraner, John, Eugene
 Trye, John, Astoria
 Van Anken, L. M., Roseburg
 Waite, F. L., Eugene
 Waterhouse, John, Route 1, Warrenton
 Weatherspoon, H. H., Elgin
 Weed, Howard, Everett, Beaverton
 Weland, L. A., Roseburg
 Wise, Herman, Astoria
 Winston, H., A Roseburg
 Worsley, Ben S., Astoria
 Wood, R. H. C., Roseburg
 Yothers, M. A., Medford

AMENDED ARTICLES OF INCORPORATION

of the

OREGON HORTICULTURAL SOCIETY

Know All Men by These Presents: That we, the undersigned, Homer C. Atwell, of the county of Washington; Frank W. Power, of the county of Multnomah, and James R. Shepard, of the county of Polk, all in the state of Oregon, being officers of the Oregon State Horticultural Society, unincorporated, and having been duly elected to the respective offices hereinafter specified, in accordance with the usages and regulations of said Society, do hereby associate ourselves together for the purpose of incorporation, under and by virtue of the general incorporation laws of the state of Oregon, relative to religious, literary, benevolent, charitable and similar societies; and we do make, subscribe and adopt, in triplicate, these articles of incorporation, to-wit:

1. The name assumed by this corporation, and by which name it shall be known, is Oregon State Horticultural Society; and its duration shall be unlimited.

2. The object, business and pursuit of this corporation is, and shall be, as follows: (1) The development of agricultural and especially of those branches known as horticulture, floriculture, arboriculture, and forestry; (2) the development of landscape gardening, and of all arts, sciences and instrumentalities likely to elevate the character of the rural population and increase the profits, comforts and pleasures of rural life; (3) the collection, preservation and dissemination of knowledge relative to the foregoing and other kindred subjects; (4) the exploitation and development of all agencies tending to conserve the natural resources of the country, and to arouse the public to an interest in such conservations; (5) to acquire, own, hold, use, sell, and otherwise dispose of and convey real and personal property; to accept, receive and use gifts, devices, legacies, bequests, and legislative appropriations; to borrow money, and execute therefor its promissory notes, mortgages and other assurances; (6) to do any and all other acts and things which may be necessary, advisable or convenient, for the purpose of more effectually accomplishing the purposes aforesaid, or any of them.

3. The estimated value of the property and money possessed by said Society at this time is one hundred dollars; and the sources of its revenue or income is, and will be, dues of its members, subscriptions, donations, devises, legacies, bequests and legislative appropriations, and any income which may be derived from the investment or use of any moneys or property so acquired.

4. The respective title of the officers making these articles are as follows: Homer C. Atwell, president; Frank W. Power, secretary-treasurer, and James R. Shepard, vice-president. They shall hold their respective offices until their successors therein shall be duly elected and qualified. Their successors in office shall be elected by a majority vote of the members of said Oregon State Horticultural Society who are in good standing and present, and voting, at an annual meeting of said

society on the first Tuesday of December, 1909; and on such other day and month of each succeeding year thereafter as may be designated in the by-laws of said society as the date of its annual meeting, said annual meetings to be held in the city of Portland, Oregon.

5. The location of said Society shall be in said city of Portland, in the county of Multnomah, and state of Oregon.

HOMER C. ATWELL, President,
J. R. SHEPARD, Vice-President,
FRANK W. POWER, Secretary-Treasurer.

We, the undersigned, A. P. Bateham, president; E. H. Shepard, vice-president, and Frank W. Power, secretary-treasurer of the Oregon State Horticultural Society, certify that at the annual meeting of the Society held November 16, 1911, the following resolution was unanimously adopted:

Resolved, That the officers take the necessary steps to file amended Articles of Incorporation placing the legal powers of the Society in the officers and three trustees, in place of the officers alone, as at present.

In accordance with said resolution the following, to be known as Section 6 in the Articles of Incorporation will be appended as the amendment thereto:

"Section 6. The management of the affairs of the Society shall be vested in the president, vice-president and secretary-treasurer and three trustees. They shall be elected at the annual meeting each year, which shall be held at such time as may from time to time be fixed by the by-laws. The officers and trustees shall hold office for such time as provided from time to time in the by-laws."

Signed in triplicate and sealed with the seal of the Society this fifteenth day of October, 1912.

A. P. BATEHAM, President
E. H. SHEPARD, Vice-President,
FRANK W. POWER, Secretary-Treasurer.

Acknowledged before Notary Public.

**AMENDED BY-LAWS OF THE
OREGON STATE HORTICULTURAL SOCIETY**

(Adopted November 20, 1912)

ARTICLE I—The Society Year.

The Society year shall begin on the first day of January.

ARTICLE II—Membership.

Section 1. The membership of the Society shall consist of annual, life and honorary members.

Section 2. Any person who shall pay the annual membership fee of one dollar shall thereby become a member for the current year, ending with the opening of the next annual meeting.

Section 3. Any person who shall pay the life membership fee of ten dollars shall thereby become a life member and shall be excused from further payment of membership fees.

Section 4. Any person who in the opinion of the Society has done the society or horticulture in general some especially valuable service may be elected to honorary membership by a two-thirds vote of the members present at any regular meeting and shall be excused from payment of all membership fees.

Section 5. Those who were honorary members before the incorporation of this Society shall continue to be considered honorary members, without further action of the Society.

Section 6. All members shall be entitled to the same rights and privileges.

ARTICLE III—Officers.

Section 1. The officers of this Society shall be a president, a vice-president, and a secretary-treasurer, and three trustees. The last four shall be under bond in such sum as the Society may designate for the faithful discharge of his duties.

Section 2. The president and secretary shall be ex-officio members of all committees, except the auditing committees.

Section 3. The duties of said officers shall be such as usually devolve upon like officers in similar organizations; provided, that no bills shall be paid without the approval in writing of the president and secretary-treasurer; and provided further that a committee of three, to be chosen annually by the Society, shall audit all bills, reports and accounts and render a report thereon to the Society.

Section 4. The secretary shall, at each annual meeting, render a report showing:

First—The personal property of the Society in his hands.

Second—The irreducible funds, securities and bills receivable belonging to the Society, stating how such funds are invested, and the

interest then accrued on the same and on the other securities and bills receivable. Said report shall cover all documents of permanent value or use.

Third—He each year shall render to the auditing committee a complete report of the cash receipts and disbursements for the preceding year and this report, together with the report of the auditing committee, shall be made a part of the proceedings and printed in the annual report.

Fourth—The premiums offered, and by whom offered, and what was the final disposition of same.

Section 5. The three trustees appointed by the governor as a Board of Control of the state appropriation, together with the president and secretary of the Society, shall constitute an executive committee, which committee shall be empowered to transact any and all business of the Society that may be necessary between meetings of this Society.

The executive committee shall from time to time fix the compensation of the secretary of this Society as they may deem the requirements of the office may justify.

ARTICLE IV—Date of Annual Meeting.

The annual meeting shall be held on such days in November or December of each year as the officers may, from year to year, designate. The officers shall be elected on the afternoon of the second day of the annual meeting. The president, vice-president and secretary-treasurer shall take charge of their office on the first day of January next following their election and hold office for one year, or until their successors are elected and qualified.

The trustees shall be chosen in accordance with the Act of Legislature so long as an appropriation is given by the state, and unless otherwise provided therein shall hold office for three years. In case the legislature shall fail to grant an appropriation in any year, the trustees shall be elected for three years by the Society.

ARTICLE V—Other Meetings.

Section 1. Other meetings may be held at such times and places as the Society by vote at a previous meeting may designate.

Section 2. The president may call a special meeting at Portland by causing notice thereof to be mailed to each member at least five days previous thereto, such notice to state the object of such meeting.

Section 3. It shall be the duty of the president to call a special meeting whenever requested in writing so to do by fifteen or more members.

ARTICLE VI—Publications.

Every member shall be entitled, without cost, to one copy of all official reports published by the Society.

ARTICLE VII.—Quorum.

Nine members shall constitute a quorum for the transaction of business, but a less number may meet, call to order, and adjourn from time to time.

ARTICLE VIII—Order of Business.

The following order shall be observed as a guide in the transaction of business at the annual meeting of the Society:

1. Call to order and reading of minutes of previous meeting.
2. Reports of officers.
3. Reports of committees.
4. Unfinished business.
5. New business.
6. Election of officers.
7. Papers, addresses, etc.

ARTICLE IX—Rules of Practice

Roberts' Rules of Order shall govern the deliberations of the Society.

ARTICLE X—Irreducible Fund.

All life membership fees, together with the sum of \$2,000.00 of the amount heretofore realized from the bequest of the late Cyrus E. Hoskins, the "Lambert Fund," and the "Cardwell Fund," shall be kept intact and invested on good security, so as to produce a revenue, if possible, and only said revenue shall be expended by the Society.

ARTICLE XI—Personal Property.

The secretary shall be the custodian of all badges, banners, dies, medals, blanks, books and other property of the Society of value or suitable for future use; and shall exact from his successor an itemized receipt for said property, when same is transferred.

ARTICLE XII—Record of Reports.

The annual reports of the officers and of the auditing committee and all reports relative to the finances, or property of the Society, or the disbursements of its funds, shall appear in full in the record of transactions, in the order of their filing with the secretary following the record of the meetings at which the reports were presented. The treasurer's report shall be made to the auditing committee showing a full report of receipts and disbursements and said report together with report of the auditing committee shall be made a part of the proceedings.

Said reports may either be pasted upon said record, or copied, in which latter case the copy shall be attested by the secretary.

ARTICLE XIII.

The executive committee may, if they deem it advisable, lend the assistance of the Society in any display of fruits and products of the state.

ARTICLE XIV—Amendments.

New by-laws may be adopted and old ones changed or repealed by a two-thirds vote of the members present at any meeting; provided, notice of such proposed adoption, change or repeal shall have been

given at the last previous meeting of the Society; and provided, further, that a vote to change or repeal Article X shall be by yeas and nays, recorded on the record book of the Society. Said vote shall be taken only at an annual meeting, and after due notice given at the annual meeting next preceding the same.

SECRETARY'S ANNUAL REPORT

To the Officers and members of the Oregon State Horticultural Society:

I wish to submit my annual report for the year ending December, 1918. The past year has been one of unusual interest to the horticulturist. The usual number of pests have been with him and the cost of everything he has had to buy has been abnormally high. Labor has been scarce and consequently wages have greatly increased.

However, to offset this their products have been in keeping with the expense and the abnormally large crops of almost all variety of fruits and berries have left him with a smile on his countenance that has been missing for some time. Those who have faithfully cared for their trees and vines have been rewarded.

We are all greatly thankful that the world's greatest war has ended and ended in the only way possible for it to end—that with victory for our armies and the armies of the countries associated with us. This will bring a renewed demand for all that our soil will produce because of the wanton destruction of the orchards and vineyards of Northern France by a retreating foe, a demand that must be supplied until such time as those orchards may be regrown and brought into fruition.

We have been fortunate in having a "Friend at Court" in the person of Senator Chas. McNary, who has stood nobly by the fruit industry and has been instrumental in helping it over many rough places, especially the fruit juice industry as well as freight rates for the apple men. His term as trustee expires this session and I hope that this body will see it is to its best interests to re-elect him in that same capacity.

At this time an effective campaign should be started in advertising the prune. The government has done much to bring it into prominence but this will be lost unless it is followed up.

Death has again invaded our numbers and we have to record the death of our honored member E. H. Shepard, who has been so intimately connected with the apple industry of the state. His loss is a distinct loss to the horticultural interests of the Northwest and Hood River in particular.

Our entire irreducible fund is invested in Liberty Loan Bonds and consists of \$2500 in 4 per cent and \$350 in 4½ per cent. I might say, however, that we have one note of \$50 given by Dr. J. R. Caldwell as a contribution to the Caldwell fund, which has never been paid nor has interest on same ever been paid. Dr. Caldwell passed away several years ago and I would suggest that this body give the secretary authority to charge off this note against the irreducible fund.

Our general fund is becoming depleted a little each year and that we may not deplete this further I have asked the Secretary of State to include in his bi-ennial budget the sum of \$1000 to cover the absolute expenses of this office for two years. I hope the legislative

committee will assist in bringing such pressure to bear that this small appropriation will be granted.

We must do this or else we must increase the life memberships, as the annual income is not enough to cover the printing of the minutes each year. However, this latter must be kept up as the minutes of this association are asked for by nearly every college and horticultural society in the United States owing to their great value educationally.

I can only breathe optimism for the fruitgrower for the future. They are coming into their own and the demand for their products will be greater than ever.

Respectfully submitted,

C. D. MINTON.

**FINANCIAL STATEMENT AND TRIAL BALANCE FOR THE
OREGON STATE HORTICULTURAL SOCIETY FOR
THE YEAR ENDING DECEMBER 31, 1918**

Lambert Fund	\$ 100.00	
Hoskins Fund	2,000.00	
Cardwell Fund	168.50	
Life Membership Fund	585.00	
		<u>\$2,853.50</u>
Invested as follows—		
United States Liberty Loan, 4 per cent.	\$2,500.00	
United States Liberty Loan, 4 ¼ per cent.	350.00	
Ladd & Tilton Bank	3.50	
		<u>\$2,853.50</u>
General Fund Receipts—		
Balance on hand last report	\$1,335.91	
Interest on bonds	105.21	
Annual memberships	94.00	
Life memberships	10.00	
		<u>\$1,545.12</u>
Disbursements—		
Portland Trust, rent vault	\$ 10.00	
J. L. Hartman Co.	7.50	
N. W. National Bank, L. Loan	350.00	
Statesman Pub. Co., Printing	167.16	
C. D. Minton, expense, minutes, sten.	50.00	
Wells Fargo Express	1.77	
Statesman Pub. Co., printing	3.50	
Portland Engraving Co., cut	4.40	
C. D. Minton, expense Roseburg meeting.	32.50	
Statesman Pub. Co., printing	13.25	
Irwin Hodson, badges	21.05	
Ladd & Tilton, expense, exchange	3.06	
		<u>\$ 664.19</u>
		<u>\$ 880.93</u>

Trial Balance

Cash on hand	\$ 880.93	
Loss and Gain		\$ 890.28
Lambert Fund		100.00
Hoskins Fund		2,000.00
Cardwell Fund		168.50
Life membership		585.00
Government Bonds	2,850.00	
Supplies ..	9.35	
Due Irreducible Fund	3.50	
	<hr/>	<hr/>
	\$3,743.78	\$3,743.78

We, your committee, duly appointed to audit the books and accounts of Mr. C. D. Minton, the secretary-treasurer of the Oregon State Horticultural Society, hereby certify that we have this day examined all books and records submitted to us and find the same in order in every respect covering the year ending December 31, 1918.

We also certify that the cash on hand, as shown by the Trial Balance is on deposit with the Ladd & Tilton Bank, and we have had exhibited to us U. S. Liberty Bonds to the aggregate sum of \$2850.00.

Dated Portland, Oregon, January 27, 1919.

E. A. BURT,
ALBERT BROWNELL,
J. B. PILKINGTON.

REPORT OF MEETING

THURSDAY, December 5, 1918

Meeting called to order by President H. C. Bailey.

The welcome address was given by Hon. Binger Herman.

ADDRESS OF WELCOME

By Hon. Binger Herman

Mr. President, and members of the Horticultural Society of the state of Oregon:

In obedience to the request of the mayor of our city, I have the honor of welcoming you to our midst, and to assure you that not only the people here but throughout our widely extended county greatly appreciate your coming, and the good you shall confer upon their industrial advancement in the several subjects to be discussed at this session.

We have an added pleasure in this welcome, since we can also congratulate you as a body upon your thirty-third anniversary and your public service as a state organization.

Nor can we forget the blessed ending since your last annual session of the most gigantic and destructive of all wars which the civilization of the world has had to contend. Few nations have escaped the horrible consequences which have followed in the wake of war.

And while millions of homes have been marked with the sable crape upon the door or with a golden star in the service flag, yet we hope that from the awful sacrifices a new order will arise from the ruins and a new promise from the sorrows wrought; and that a new determination will inspire us to begin a future, greater and more enduring, for the happiness, personal freedom and good government of all the world.

Our own beloved nation which so freely pledged the military service of ten millions of her patriotic sons in the allied cause against autocracy and kingly rule, and expended billions of treasure in the conflict, has not only had our approval, but the gratitude and commendation of a redeemed world. It was a contest for the civil and religious freedom of all mankind, and directly involved the supreme doctrine proclaimed in the immortal declaration of our own national independence: "That governments are instituted among men deriving their just powers from the consent of the governed."

Terrible as that conflict was, yet to the optimist it has bequeathed to posterity many blessings which time will confirm. Among those to our own Republic which give promise to all the advocates of peace, none will prove more lasting than those which relate to agriculture. In that respect, among others, we had retrograded and become remiss in the commercial policy of earlier years of American water trans-

portation to the markets of the world. For fifty years American-built and American-manned ships were the pride of our people and the wonder of the world. They once transported four-fifths of our exports and imports. From that period a decline was observed until at our Civil War but three-fourths was recorded, with a continued falling until the beginning of the world's war in 1914 there was but one-tenth to our credit, and the American flag had largely disappeared from the high seas. And when we entered that war it found us without ships and without seamen to operate them. That war aroused us from our torpor of over half a century and we began the erection of great ship yards, for the building of both merchant and battle ships of wood, steel and concrete.

For every successful farmer three essential aids are paramount. The failure of either is the failure of all. They are production, transportation, and markets. Of these, transportation may lead the rest. This applies to the navigable water as well as to the land surface. A good farm on a poor road is worth less than a poor farm on a good road to the market place.

The quickest, least expensive and most direct route to that place is the most urgent demand in all our commercial activities.

Toward this end the great war has aided greatly. For the land roads much had already been undertaken and a new and better day was thus in store. Not only the states and counties but the general government, have donated millions and millions of dollars for the improvement of public highways in the different states. Following these aids come the rural free mail delivery to millions of farm homes, and soon after came the easy-going automobile for the farmer's quick or leisurable transit to the nearby town and among the neighbors. To complete the picture in this new day in the farmer's life, there must be included the telephonic voice, over wire and through the air, for either business or for social gossip, thus saving in the moment of emergency or in time and expense, the prompt accomplishment of ends desired. And lastly let us not forget the phonograph now in every abode, where song, music and mirth comes almost automatically to cheer the vacant hours in the farmer's household. With all these we think of the district school house and the country church not far away.

Indeed, the luxuries of yesterday have become the necessities of today.

A popular slogan: "Back to the Land"—is already ringing in our ears, and is being re-echoed by hundreds of thousands of our returning boys from the battlefields and cantonments.

In the earlier years of the Republic this was an inspiration. Then 70 per cent of our population was rural, and but 30 per cent was of the city. While now that of the congested city is 70 per cent and but 30 per cent is of the country!

In those former days it was every citizen's pride and longing to possess a country home, although with but few of the comforts of the present.

How well we remember this fondness of even the most eminent men of our country. It was esteemed not only a pleasure but a duty to themselves and to their families. Washington longed to return to his broad acres at Mount Vernon; Jefferson for Monticello; Monroe for Montpelier; and President Jackson for his old Hermitage farm, and upon these estates they lived contentedly in their venerable years. In

the far away days of the Roman Empire, history tells us of the repose enjoyed by Cicero upon his Roman Farm; and of the great Roman Emperor and General, Dioclesian, of whom it was said that he abdicated the exalted station of Emperor to escape the troubles of state and that he retired to his farm, where he engaged in its activities. Soon an invasion of the Empire by the common enemy alarmed the people and they chose a committee of Rome's most illustrious men to visit Dioclesian and implore him to return and resume the cares of state, but he declined and said to them, if they could but see the cabbages he had cultivated with his own hand they would not insist on his resigning such pleasures and contentment even again to become the Emperor of Rome.

It is to be hoped that in our own land, we shall have increased devotion to the old farm home. Our government, to which I have before adverted, has left nothing undone to foster an agricultural interest in this country, and in promoting the convenience, the happiness and prosperity of the American farmer; and there should be added that more recent aid in the system of loans, whereby such loans are advanced with a low rate of interest on the farm as security, making the debt payable automatically with ordinary promptness on the owner's part.

Agricultural college land grants which furnish a fund for practical education in all branches of horticulture and livestock is a further governmental aid and should not be forgotten.

To the farmer's door are conveyed free by mail those valuable and well illustrated agricultural books published each year by the government. With these there is also within reach by those who desire them, and equally free, the numerous bulletins in pamphlet form on many subjects relating to plant and tree life, as well as to livestock and domestic fowls, and with a review of their many diseases and of their prevention and cure.

With all these beneficent aids, what more can still be contributed toward vitalizing the energies of the American farmer; and at the same time elevating further our agricultural science to its already high plane and high destiny.

Your own labors and your annual sessions are doing much to this end, for they teach the primary truth of the earth's contributions to man without which he could not exist. Indeed, it ranks next in study and research to that of the human anatomy.

It may be said in extenuation of many that we are not all endowed with the same faculties for high endeavor. Different results proceed from the same aims. As to this a great writer has said, "Give one man a bleak rock and he will turn it into a garden; give another man a fertile garden and in nine years' time he will turn it into a desert." This being largely true in human attainment makes it the more necessary for increased endeavor on the part of those best qualified.

And now having thus commented upon the meaning of the great studies in which you have engaged, and the invaluable knowledge you are conveying to your fellowmen, it only remains for me, thrice again to welcome you to our city.

**ADDRESS OF WELCOME FROM THE STATE BOARD OF
HORTICULTURE**

By Chas. A. Park, Roseburg, Oregon.

Mr. President, Ladies and Gentlemen of the Oregon State Horticultural Society:

It is my privilege to again convey greetings from the State Board of Horticulture to you assembled for your thirty-third annual meeting. We know that you will have a profitable and enjoyable session while under the hospitable care and protection of our friends at Roseburg.

We have had a trying time during the past year endeavoring to carry on the necessary work to produce the crop nature has granted to us. I mean, trying, in that we have had a shortage of labor to care for the growing fruit crops. The increase of wages and the inefficiency of labor has more than doubled the cost of production. Now that the crops are harvested and we have received the returns from the sales, we feel that we have done our conscientious duty and are now ready to rest a spell and renew former acquaintances.

While you are assembled here, I wish that you would give some thought to the Government standardization of apple packing, which matter is being formulated right now. Let us see to it that our particular section of the country is not discriminated against.

The matter of quarantine against California potatoes is a live subject and we are trying to effectively keep the tuber moth out of Oregon. An important meeting on quarantine matters was called by Mr. Hecke, the California Commissioner, to meet at Riverside, California, in last November, but was postponed on account of the influenza. The date of the meeting has not been set. We know that California is aware of the menace that the tuber moth is to her potato crop. We do not want to take up her trouble.

The program gives promise of an enjoyable and profitable meeting, so I will not detain you longer; I know that you all join with me in saying that we are glad to be in Roseburg.

**ANNUAL ADDRESS OF THE PRESIDENT OF THE OREGON STATE
HORTICULTURAL SOCIETY.**

By C. H. Bailey, President

At this, the thirty-third annual session of the Oregon State Horticultural Society, we have met for the purpose of exchanging ideas and experiences whereby we may not only increase our knowledge of the great science of horticulture, but may also, through the mental stimulus of association, return home determined to put into practice the application of the necessary details that make for the monetary success and the gratification which results from producing superior food products.

We should, each and every one of us, be proud of our membership in this society which has helped to place Oregon as one of the leading fruit producing states of the Union, and this has been accomplished in less than a generation. In fact, a few of the charter members of this organization are present at this meeting, and these pioneers of

Oregon's fruit industry are entitled to the highest regard and esteem by us who have come later and are enjoying the fruits of their labor.

Not only owing to war conditions, but also to the fact that the people generally, especially the mother and housekeeper, have become convinced that fruits are a necessary part of the daily diet, the horticulturalist has rapidly come into being, recognized as a factor in the production of the nation's food supply. This year sees an eager demand for all fruits, not only from our own fair state of Oregon, but from all parts of the world.

The progressive fruitgrower is continually increasing the amount of fertilizer used in his orchards, many experiments the past few years emphasizing the increased yield from the application of nitrates either in the commercial form, or from the early sowing of leguminous crops that can be plowed under in the spring. This, together with improved orchard practice along the lines of pruning, cultivating, etc., is not only increasing the yield in our orchards, but is also improving the color and keeping qualities of our fresh fruits. Results have shown the wisdom of adding commercial fertilizer, barn yard manure and the turning under of leguminous cover crops in our orchards. This orchard practice is past the experimental stage, and the speaker confidently expects to see the practice of feeding our trees come into more extended use. Notwithstanding the high price of vetch seed, many orchardists claim they cannot afford not to sow it in their orchards this year.

The fact that the Government has taken cognizance of the needs of the farmer in better distribution of farm products, and that the Bureau of Markets is gradually eliminating profiteering in the fruit industry, should further encourage the horticulturalist. It cannot be denied that the fruitgrower has been, in the past, the victim of many shady transactions upon the part of the commission merchants through their system of re-sales and other practices. Recent rulings of the Interstate Commerce Commission and the Bureau of Markets have, however, greatly improved the possibilities of the horticulturalist in obtaining justice in the sale of his products.

Fruitgrowers who have been the fortunate possessors of well cared for prune orchards have reaped a liberal reward for their labors the past few years, and this year the Government has been an extensive purchaser of the Oregon prune, due, largely, to the misfortunes of our brother horticulturists in California in losing a large percentage of their crop.

With the wide advertising given the prune by our boys in the army and navy, and the demand that is being created for this produce through the shortage of the sugar crop, the prune growers of the Pacific Northwest may feel assured that any danger of over production is a myth, notwithstanding the fact that the acreage planted to prune trees has doubled within the past five years.

Probably the greatest single offering to the grower of fresh fruits the past year is the Sykes System of Packing apples. This method, doing away as it will when it comes into general practice with the necessity of the employment of experienced packers and the substitution of unskilled labor and sizing machines, marks a distinct advance in the packing of fresh fruits. This system also permits the fruit to be better ventilated, especially when in transit. Our committee on needed legislation should take up the matter at the next session of the legislature of having House Bill 377, Chapter 123, amended to include the necessary size box for this pack.

IN MEMORIAM.

By Z. C. Seabrook.

EDWARD HENRY SHEPARD.

Mr. Shepard is dead. There is sorrow in his home. Friends and business associates mourn. The announcement from St. Vincent's Hospital Monday morning, April 29, of his passing came as a shock. Cheerful even in his illness, his friends had believed he was soon to be with them again, and their grief is keen.

Mr. Shepard sacrificed his life in a conscientious devotion to his work. Fruitgrowers in the Pacific Northwest, in whose interests he labored for more than fifteen years, owe him a debt that never could have been paid. It was said of Mr. Shepard that no one man did more to make fruitgrowing a business enterprise and to direct the marketing to profitable channels.

Sixteen years ago Mr. Shepard purchased an orchard in Hood River valley. Years before that he had devoted his studies to horticulture, and with the purchase of a farm he put his theories into practice. The fruitgrowers of Hood River soon recognized his ability, and he was made manager of the Hood River Apple Growers' Union. One of his first acts was to improve the grade and pack of apples, and he drew up the original rules for grading and packing which were adopted throughout the Northwest. For twelve years he was a director of this association, which later became known as the Apple Growers' Association of Hood River. He was manager for six years of the Hood River Fruit Growers' Union, which shipped strawberries and small fruits. The Hood River Fruit Growers' Union later was merged into the Apple Growers' Association.

In 1903 he established Better Fruit, a magazine, as its name implies, devoted to the fruitgrowing industry. Readers of Better Fruit will testify to his great work in helping orchardists and marketing associations solve their vexing problems.

Mr. Shepard was an early advocate of co-operation in the production and marketing of fruit. For the past fifteen years managers of the fruit fairs or horticultural conventions in the Pacific Northwest, and even in the far Eastern states, never considered their program complete without having Mr. Shepard appear for an address. He gave freely of his time, energy and money to make these addresses, and there are many who owe their success today to the advice given by Mr. Shepard.

Mr. Shepard was born in Marysville, California, December 24, 1857. His father, Mr. E. A. Shepard, was a skilled horticulturist in New England many years ago, and on moving to California made a reputation as an authority on matters of fruit culture. It may be said that Mr. Shepard grew up in an atmosphere of horticulture. In 1880 he graduated from the University of California. He always took an active interest in collegiate affairs and was the prime mover in organizing the University Club of Hood River several years ago. At college he was a member of the Zeta Psi fraternity.

Mr. Shepard was a prominent member of the American Pomological Society and an honorary member of the State Horticultural Societies of Oregon, Washington and Idaho. He was also a member of the International Apple Shippers' Association, having been honored with a membership that was unique in the fact he was the only member of the association that was not a shipper.

Meeting adjourned.

FRIDAY, December 6, 1918

MORNING SESSION.

Meeting called to order at 9:55 by President C. H. Bailey.

Mr. Bailey: The first thing on our program this morning will be a paper by Prof. A. G. B. Bouquet, Professor of Vegetable Gardening, O. A. C., on the Factors Affecting the Success of the Broccoli Industry.

FACTORS AFFECTING THE SUCCESS OF THE BROCCOLI INDUSTRY.

By A. G. B. Bouquet, O. A. C.

In view of the fact that there are three different subjects of a widely different nature to be discussed during this morning session, I shall make my remarks comparatively brief, leaving time for a discussion of the same at your pleasure.

Four seasons of broccoli production and shipping have demonstrated that there are certain vital factors essential to the success of the business and that there are associated with these factors problems which the grower must individually meet. I will attempt to merely enumerate some of these factors.

It has been demonstrated that, given a good product uninjured by weather conditions, broccoli will carry well into all large centers of the country and be sold at a profitable price to the grower. Furthermore, the markets for broccoli have just begun to be reached and there is yet a big opportunity for development. Correspondence by me with leading wholesalers in different cities of the Middle West and East shows that in many cases these dealers had not handled Oregon broccoli in car lots or even in crate lots but judging from the samples which they had received they were anxious to handle the product, knowing that there was a profitable market for the same in their city.

Broccoli problems at the present time are mainly those of production, important as the marketing factors may be. Some of the things which are at the present time jeopardizing the broccoli industry are uncontrollable while others can be regulated to a more or less degree by the individual grower, according to what his farming practices may be. I will name some of the factors which are affecting the value of the crop at the present time.

1. Uncontrollable weather conditions. The results of winter and early spring injury is well known to every grower. The greatest injury occurs on land which is wet and poorly drained or that which is exposed to driving wind. Summer weather conditions dealing largely with the problem of soil moisture are treated a little bit later under the heading of moisture conservation.

2. Variation in trueness to type of strains of St. Valentine. Of extreme importance in growing broccoli for a profitable crop and to

obtain a uniform product suitable for distant shipping is the character and quality of the seed; in fact, it may be said that it is a matter of life and death to the broccoli business that the growers obtain seed which is of the best type. This factor is uncontrollable on the part of the grower except that he uses the greatest caution in obtaining as good a strain of the variety desired as possible. Many crops have suffered and proved unprofitable in the past because of the use of deteriorated types of broccoli found in the field. All of the production factors, such as soil fertilization, etc., are practically subservient to the foundation of the crop—namely, the seed strain. The best of soils adapted to broccoli will not change the characteristic of the strain nor will the addition of various fertilizers have a beneficial effect in changing the value of the strain. As in many other phases of crop production, the name of the variety may be applied to all strains but there is a big difference in the money value between the strains themselves.

The difference in strain values is plainly shown by the Oregon Experiment Station Record of 1918 in a test of four different strains of St. Valentine. One of these was grown from imported seed or sold as such; one was a strain domestically grown, the two others being strains purchased from Portland seed dealers. Observations were made in the field to determine primarily the percentage of the crop which was true to type and which made satisfactory heads, also the percentage of off-type plants, including those which were either of the cabbage type or kale type or which in any of them produced unmarketable heads. The results were as follows: The imported strain produced 75 per cent plants true to type, giving marketable heads, 8 per cent were of the cabbage type, and 17 per cent produced poor heads that were not good enough to ship except as locals. The strain as a whole might be characterized as satisfactory but contained too large a percentage of off-type plants. The domestic strain yielded 86 per cent true plants, 6 per cent of the cabbage type, and 8 per cent of every 100 were unprofitable plants. This strain was superior to the first named and was the best of those under trial. Strain No. 3 from a Portland seed house gave 60 per cent good plants and 40 per cent unprofitable. Strain No. 4, also from a Portland firm, was a miserable failure and if planted widely on an acreage basis would have resulted in a considerable loss to the grower. Very few of the plants showed any tendency toward the St. Valentine type and almost the entire crop, that is of the strain No. 4, was of the small-stemmed kale type either producing miniature ricey heads of no value or no curds at all.

It is very evident that while a variety may be recommended for certain districts, the problem lies not in the choice of the variety but a good type or strain of the variety, the pedigree of which should be known as far as possible before it is used. This can be done by obtaining seed from some reliable grower whose strain year after year is reliable, whose type is fixed and whose integrity will not permit anything but a close roguing of the seed field in selecting seed plants. Such seed is worth far more than is now being paid for it and it is but a small investment compared with the results between the crops of the various strains. If possible there should not be a crate of broccoli leaving Roseburg that is not grown from a strain of the very best quality. Mr. Kruse will enlarge on these points in his paper on the growing of seed.

3. The question of soil moisture is no less important and is almost co-equal in importance to the question of seed strain. A severe drawback to the successful growing of broccoli in the past has been a lack of moisture at a critical time previous to plant setting time and later on. Can this soil moisture content be increased by the different farming methods. I think in a good many cases it can. During the very dry summer of 1917 a crop of cabbage was produced by a grower without irrigation who averaged from 14 to 16 tons per acre on soil of average fertility. Many other crops of cabbage that year were failures due to lack of soil moisture. This piece of ground in question was plowed early in the spring with manure incorporated at that time and it was regularly stirred every ten days or so or whenever the team happened to be going over the field or in the direction of the field up to the time of plant setting. The cabbage crop was entirely grown with the aid of the moisture that had been conserved from the early spring. I saw many crops of cabbage that fall and can vouch for the splendid condition of this crop as compared with many others that had been dwarfed through drouth. In cases where broccoli is grown year after year on the same land it is impossible to give the soil the fall or early spring tillage that is important in the conservation of moisture. This, therefore, brings me to another factor which is:

4. The rotation of land to farm crops for broccoli growing. The maintenance of humus and the incorporation of organic material is the foundation of future broccoli crops that are to be grown in this district. Growers would all do well to consider more the value of the rotation of crops on land which is used for broccoli even though the acreage that is available for broccoli growing be small. Especially would this be beneficial on the heavier types of soil where the land has a tendency to pack considerably in the strain due to the harvesting of the crop. On the heavier types of soil on the College farm at Corvallis, it has been plainly noticed that crops of kale diminish each succeeding year in yield where the kale has been grown on the same land without changing the crop. As there are but few farm crops in the state of Oregon that can be continually grown on the same piece of land year after year without diminishing in yield in the crop itself or a depreciation of the land due to the methods necessary in producing that crop. Some of the practices in the growing of broccoli such as the packing of soil in harvesting in the spring are undoubtedly injurious to the physical makeup of the soil. This question is being observed more and more by growers in different parts of the broccoli communities who state that they have noticed very decided change in the physical condition of the soil where broccoli has been grown year after year. This change has no doubt been largely brought about by the packing of the land in the spring due to the necessary walking on it in the harvesting of the crop.

There is much to be said on this subject but I shall not mention much which will undoubtedly be discussed at the close of this paper.

5. The relation of fertilizer practices. In regard to the production of the crop fertilization of the land is an important factor in broccoli growing and in profitable broccoli yields. During the last few years observation have been made regarding practices of various growers concerning their methods of fertilization of the ground. Of course, it is to be expected that these fertilizer practices were varied to a certain extent but where growers are in the habit of purchasing the same kind of fertilizer, such as the commercial fertilizer which has

been recommended to and used by the growers, it is interesting to note the difference in the practices of growers in using this fertilizer, such as the amount used, time of application, etc. As regards the use of commercial fertilizer on lands that are now being devoted to broccoli there are those who consider it unnecessary to use any of this fertilizer for the production of a profitable crop. There are those on the other hand who consider that it is not possible to produce a crop of the highest marketable value unless some commercial fertilizer is used. With these variations of opinions and practices in mind, tests were made during the past two years which should help in giving some data as to the value of the different amounts of fertilizer and other things connected therewith in the uses of the same on broccoli land. Some of the tests which were conducted during the past year were hindered to a great extent by the lack of trueness to type of the plants in the various fields but in spite of this fact some results were obtained in a year's trial which show that at the present time we do not know a very great deal about the value of fertilizers in their relation to profitable broccoli crops.

There are several things the grower must reckon with in using commercial fertilizer on broccoli. First, is the land run down, so-called, or not up to average fertility as shown by previous crops on it? Is it lacking in humus content? If this is the case, it is very probable from past experiences that the addition of commercial fertilizer may be attended with no increased yields, because of the physical state of the soil. It has been demonstrated many times over with other vegetables that the greater response in yields to the application of commercial fertilizers comes from those soils which are moderately rich in humus and not from the worn-out land. Secondly, what is the amount of fertilizer that will produce the best net profit, taking into consideration the present factors of available material? If 200 pounds is not sufficient, does 400 pounds show an improvement or is it best to use 600, 800, or 1200 pounds? Will the net result, deducting the cost of the fertilizer, justify the expenditure and leave a profit? Third, the annual application of fertilizer. There are some whose practice it is to use annually similar material on their land in regular amounts. Is not this a hazardous practice, if no simple tests are made to demonstrate whether or not this is good farming business?

Let me call your attention to the fact that the onion growers in the upper part of the Willamette Valley have been using potash for a number of years in growing their onion crops, but since the war they have not been able to obtain their regular supply of potash. Nevertheless, they have produced splendid crops of onions without the use of potash, demonstrating in a great many cases that the use of the potash previously was not necessary.

Fertilizer tests on broccoli areas 1917-18 show a 22 per cent increase in marketable heads on a crop which was fertilized with 400 pounds of Beaver A fertilizer as compared with a plot of land adjoining which received 800 pounds per acre. There was no appreciable difference in the check or the unfertilized area. All areas were inferior to an area which had been rotated and cover cropped. There was practically no difference between the unfertilized area and the area to which 800 pounds of fertilizer had been added. Land which was considered "superior"—so-called—by the owner yielded a crop which was 33 per cent better than either of the fertilized areas of soil, indicating that land in a normal condition which is in a better state of fertility or which has been carefully rotated is in such a condition so

as to produce a more profitable crop than land to which is applied commercial fertilizer and upon which is dependent by the grower the character of the broccoli crop.

One area on which fertilizers were applied was ruined as far as results are concerned by the inferior type of plant which was grown. Practically no results were profitable under these conditions. However, the lower area of ground receiving manure showed a superior yield where moisture conditions were also better.

On another test area manure was placed between the rows because it was evident to the grower that there was no prospect of a satisfactory crop merely from the application of the commercial fertilizer alone unless manure was added. This naturally made it impossible for any authentic data as regards the use of commercial fertilizer to be collected that might otherwise have been obtained from this area.

There are those who submit that it would be a laborious piece of work to ascertain what are the results from application of different amounts of fertilizer. As a matter of fact this would simply entail first the testing on a uniform area of ground certain fertilizers, and, secondly, the weighing of the product in field packages as it is harvested. I am convinced that satisfactory experimental tests could be carried on if the experimental areas are comparatively small and the work is carefully done. Again, it may be that other kinds of fertilizer might be profitably applied. I have had shipped to the association some sulphate of ammonia which is commonly used at the rate of 100 to 150 pounds per acre. There are other fertilizers also besides the ones which I have mentioned that could be included in a test principally to demonstrate to the growers the wisdom of an individual test on the farm where the same crop is being grown year after year. It is not intended that the results of these experiments would justify every grower pursuing a course of practices in accordance with the findings of the fertilizer tests, but rather to demonstrate the wisdom of a test on individual farms.

Another factor which is important is a fuller realization on the part of all growers as to the uniformity of the standards of grading and packing regardless of who shall handle the crop. The broccoli grown in this district goes into the eastern and middle western markets as an Oregon product, a Douglas county product, and as such is judged by wholesalers. If there be variations in standard grades and practices in different communities of the county this only adds to the difficulties in selling the product at the eastern points to the best advantage.

There are also two phases of the possible utilization of part of the broccoli crop that might otherwise be wasted. First, the feeding value of the outer leaves which amounts to not less than six to ten tons per acre and, secondly, the use of heads which are not entirely satisfactory for shipping. In regard to the first problem, if these leaves could be utilized in some form, either by feeding directly to stock or by being made into ensilage, it would be a profitable use of what would otherwise be a considerable waste. It is true that a large part of these leaves is turned back into the soil and therefore furnishes organic matter, but at the same time there would appear to be a profitable outlet for feeding the same to stock, particularly at this time of the year when other green feed such as kale is on the decline.

Concerning the second phase of crop utilization, Mr. Holt no doubt will have some interesting remarks from the viewpoint of the use of broccoli at the cannery.

I have mentioned briefly in the foregoing remarks what I consider to be some of the factors deserving the greatest consideration on the part of the broccoli growers at the present time. I consider it especially important from an economic standpoint, that growers do not take any more acreage than they can properly look after in order to produce an A1 crop. Consequently, that the distribution of the crop be so made amongst growers that there may be a small acreage among many growers rather than a larger acreage among few.

The President: What did you say the price of that ammonia sulphate was?

Mr. Boquet: I had a price quoted not very long ago and it was worth \$90 a ton at Portland. This, however, I think was a special price given to me by the company.

Mr. Paulus: It might be that they are cutting it considerably for experimental work. We were offered a car about a week ago for \$182.50 at Portland. It would be about 9 cents a pound. (Editor's Note—The price now is down to \$140 f. o. b. Portland with a downward tendency).

The President: Professor Boquet's paper is now open for discussion. We have several very successful broccoli growers in Douglas County, and it is a subject I think we should talk over thoroughly this morning before we pass on to the next paper.

Mr. Marsh: Mr. Chairman, he spoke about commercial fertilizer for the growing of broccoli. That is something which we all want to know about; not only in regard to growing broccoli, but also in growing fruit of all kinds, and if he has any remarks to make in regard to applying fertilizer for growing broccoli or growing prunes or apples, or anything else, I would like to hear him.

The President: Have you any suggestions, Mr. Bouquet?

Mr. Bouquet: I am going to leave the matter for discussion. I think there are men here who have their ideas on the subject.

Mr. W. G. Smith: I have considered growing broccoli, and would like to hear some of these successful men tell just what they did; when they did their plowing, when they did their fertilizing and all about it, and I would certainly be glad to hear of their experiences.

The President: I do not like to call out the individual's by name, but if they don't get up before very long, I am going to. I am going to take the one that is nearest to me; one of the most successful broccoli growers in Douglas county—a man by the name of Joe Harvey. We should call him Mr. Harvey, I suppose. We would like to hear what Mr. Harvey can tell us about broccoli growing.

Mr. Harvey: I don't know as I can—I don't know as it is safe for me to get up here and tell you what I know about anything, and as far as growing broccoli is concerned we use the same ground for perhaps two or three years, and just as soon as we can get onto the ground we take a disk and go over the ground and work it up both ways, if possible, and then plow it and work it down just as soon as we plow it, so as to not allow the ground to get dry. Now, this does not seem to be very much, and yet it takes a good deal of work to get

the ground in shape, for in walking over this ground in harvesting the crop, and the ground being wet, it makes it pretty heavy and solid, and of course takes a good deal of work to get it in shape. Probably once in two weeks we will go over it with a spring-tooth and with a drag and work it up and keep it worked up. As far as applying fertilizer is concerned, it is usually best to apply that in May or the first of June, because the ground here does not get much moisture after that, and when the ground is not wet, you don't have to fertilize. The fertilizer should be on the ground and worked into it before you put in the plants. I then take the seed and usually sow it in beds about the first of May—that is, plant the seed. We usually plant them in rows about fourteen inches apart, and allow the plants to be about an inch apart in the row. We think that this produces a plant with more roots if they are quite a ways apart. The closer you put them together the less root you have on the plant, and we believe that when you set the plants out when it is dry it is necessary to have a larger percentage of roots to take up moisture which is obtained by plowing and by cultivation. It is usually best to have water, too, to water these beds, because about that time—say about the middle of May—we are apt to have a spell of very dry weather, and the plants should get started to keep the crop growing, and after they get two leaves on I don't think they will need very much water. It is the best plan to get the plants well hardened, and then when you transplant them they will not mind going from the bed into the field. These plants are allowed to remain in this bed until the last of June or the first of July—usually it is about the first of July that we begin setting out the plants into the field. Before we set the plants, we work up the ground very thoroughly, by working the ground down with a disk and drag, so as to keep it in good shape, and then we use a McMaster's transplanter. I have water at each end of the field, and we take these plants up, and if the roots are very long, we cut them off, and we take off the top of the plant just above where the heart is. The leaves are all cut off, so that there is only, you might say, the stub of the plant left. These are transplanted into rows about three feet and a half apart, and thirty inches apart in the row. That is the usual method. We think it is best for the rows to be three feet and a half apart, because if they are any closer the leaves will touch each other and will break when you work them. But these plants, as soon as they are set out, should be worked. In fact, they should be cultivated—if the ground is in good shape, they should be cultivated quite often—probably every week or ten days, until they get so large that we can't cultivate them. Of course, we can usually cultivate them until close to the middle of September, and after that, of course, we pay no attention to them. Now, that is our method. Of course we have our troubles. You know we have the aphids, that we can hardly get rid of. Possibly we don't try as much as we should, but it is a hard proposition—this year especially, and of course that is one thing that we would be interested to know how to handle. Now, in my own planting—I have an irrigating system, and that, I believe, from what I saw of it, is very beneficial to use, and I think hereafter I shall use it more than I have. I think if I can supply them with water they head better and make better stems. That is my opinion of it. If there are any questions I might answer them.

Mr. Minton: Do you ever blanch the heads? If so, how?

Mr. Harvey: In blanching the head, we cut the lower leaves off the outside and throw them right over the head crossways, so that they are a protection to the plant—that is, the head is not exposed to the sun. We sometimes have a wind that will take the leaves off, but not usually at that time of the year, but that is the way we cover up the heads.

Mr. Bailey: Has anyone anything else to tell along the line of broccoli growing?

Mr. Mason: I would like to supplement what Mr. Harvey has said by saying that a good many growers in Douglas county dip their plants in Black Leaf 40 before transplanting, and get rid of what aphids they can that way on the small plants.

Mr. Harvey: I have dipped them, but you don't dip the root at that time.

Mr. Mason: No, just hold them up by the roots and dip them into a bucket of Black Leaf 40 solution. It only takes a minute to do it. You can do a bunch at a time.

Mr. Bailey: Don't forget the soap. If there is a sufficient amount of soap in the solution, then it is not apt to do any damage to the plant. If you don't use soap the mixture doesn't adhere to the plant.

Mr. Harvey: We always dip the plants.

Mr. Bailey: Yes, I know most of the growers do, but this is for the benefit of those who haven't grown broccoli before. Are there any further suggestions? Professor Bouquet, have you anything further to say?

Professor Bouquet: I would like to have a little discussion on the question of whether there is a grower here who has raised broccoli continuously on the same land for several years, or whether he has noticed any special benefit from changing his soil and adapting a certain rotation.

Mr. Bailey: We have one grower here that I know of who has raised broccoli on the same ground at least four or five years in succession. This gentleman can answer your question. Mr. Cooley, you have been growing broccoli on your place at Edenbower for several years that I know of, can you answer the professor's question?

Mr. Cooley: It is difficult for me to tell you what to do, because of the fact that there are a great many propositions that come up, such as the condition of your land, and so on. The growing of broccoli is a new industry to us, or practically so. I have been interested in it four or five years, and some have grown it in this valley for ten or fifteen years, and I think Mr. Harvey and Mr. Owen have grown broccoli for fifteen or twenty years, although they only had a small acreage, because there was no market for it. But we all know that land has got to have the proper elements in it to grow different crops. Land that is put into wheat year after year will not produce very much wheat—we all know that, and the same thing follows if you put it in broccoli or anything else. If you have good land to start with, well

fertilized, and if you keep that fertilization up, I believe that you can grow broccoli successfully year after year for a number of years on the same land, but you have got to put back what the broccoli takes up in its growth. Now, I have just as good a crop off this land that I have had broccoli on for five years as I have from land that this was the first crop, but I have continually kept on that land not only barnyard manure, but commercial fertilizer. I am a strong advocate of the commercial fertilizer for broccoli to a certain extent—not very excessive, but about 800 pounds to the acre. Of course it makes a difference where you get your commercial fertilizer. We used to get a fertilizer here that would give a large percentage of potash and also other beneficial fertilizing agents in it, but of late years we haven't been able to get much potash; consequently I haven't used so much commercial fertilizer. But it don't make much difference how much commercial fertilizer or any other kind of fertilizer you use on your land if you don't keep your land in a condition so that the plant can take up the plant food in the land. If your land gets a crust on it you will not get much of a crop—your broccoli won't grow, and you won't get much of any other crop there except weeds, and they have a peculiar faculty of growing most anywhere, and the time to get rid of weeds is at the start. Now, I have just simply answered the question how I keep the land up, and whatever I believe can be done, I do it, and if you put back into the land what the broccoli takes up each year, or somewhere near it, you will succeed.

Mr. Bailey: Is there anything further?

Professor Lewis: I would like to suggest that while you might be able to get good crops of broccoli four or five years in succession off the same ground—in fact, you might be able to do it a good many years on a good acreage, but you will also find that it is not a good practice for you to follow. A general crop history of the United States seems to show pretty thoroughly that the growing of any distinct crop on a piece of land over a series of years leads to deterioration of soil and accumulation of diseases. I remember about three years ago when Professor Jackson was at the College, that we were called to Portland to the Ladd farm. They were having serious troubles, and we went down to look things over. We found the ground in fine shape, rich and well manured. I asked the gardener where he got his manure, and he told me that he always took all the refuse from the place and made a compost pile of it, and then mixed it with manure and put it back onto the land. What he had been doing was to make a veritable hatchery containing all sorts of maggots and pests and an accumulation of diseases and insects, and this is what is apt to take place if the same land is used over and over without rotation.

Mr. Cooley: I agree to that if a man is fortunate enough to have the land to rotate; it would be better, but I happen to be unfortunate and don't have the land, consequently I have got to put in a lot more effort and get my crops from the same land year after year.

Professor Bouquet: I would like to ask if there is anyone here who can give us his experience concerning the soil pack in relation to rotation?

Mr. Bailey: We take that up in Mr. Kruse's paper, Soil Packing, supplementing his paper on Broccoli Seed.

Mr. Harvey: If anyone can tell us how to keep the soil from packing we certainly want to know it. The best thing I know is the use of the cover crop. If they do that every year—I believe that one could make money by exchanging from one to the other. I would use the cover crop, and I believe that in that way if he would plant half his acreage to cover crop and the other half in broccoli and exchange them every year, and from that five acres he takes a good crop, he will do just as well or better than the man with ten acres.

Mr. Bailey: I have an acre in broccoli this last cultivation, and I expect to have a cover crop there when I get the broccoli off. Is there anything further? Have you anything to add, Professor Bouquet?

Professor Bouquet: Mr. President, I think your suggestion is good, but I don't want to steal Mr. Kruse's thunder. I want him to use his own thunder.

Mr. Bailey: If there is any further discussion of Professor Bouquet's paper, we can give a few minutes more to the subject. If you want to make any suggestions at all, Professor?

Professor Bouquet: Only that I would like to see more discussion on some of these points. There are a great many of our broccoli growers who are not here this morning, and others that I won't try to reach. If all our growers were to take a small acreage and get it into crop and keep it in rotation the same as other farm crops, I believe the broccoli market would be much better, and a man would get as much result from the smaller acreage as he would from a poorer crop from a larger acreage, but we have got to use the rotation. I believe you will find that the soil packing is going to trouble you, and it is largely a question of inability to get the land plowed at the proper time—you do not pay any attention to it after the broccoli is harvested.

THE HANDLING OF BROCCOLI UNFIT FOR SHIPMENT.

By J. O. Holt, Manager Eugene Fruit Growers' Association.

Mr. Chairman, Ladies and Gentlemen:

I am only going to take a little of your time, as there are other subjects on the program that are of more importance. I will give you some observations and some facts about canning broccoli as I have found them. Now, it isn't the kind of broccoli that is referred to in the subject assigned me that we want for canning. The facts are that broccoli unfit for shipment is usually unfit for canning, because we cannot can broccoli that is discolored in any way. The only kind that we can that you can't ship is the small pieces, or small heads, of good broccoli. If you can sell broccoli in the fresh state in the market at a certain price, you will understand that if we put it in the can, we add to this price the expense of the tin and other packing charges, all these things make it more expensive. If anything, we need a better quality for canning than you do for selling it in the open market. However, canning broccoli serves to lengthen the season, and that is more or less the reason for canning any vegetable.

Broccoli should be canned just as quickly as possible after it is cut. If it stands twenty-four hours, it won't make as fine a product

as if canned immediately. We have been buying broccoli all through this section and taking it up to Eugene to can. Last year we took about fifty tons. It was sometimes three or four days after cutting before we were able to can it. In this time it had lost much of its fine flavor and texture. So if you are going to make a business of canning broccoli it must be done where grown. You know in the Sacramento valley the best asparagus canneries pack it the same day it is received, and as far as the flavor of that kind of product is concerned, it is hard to tell it from the fresh vegetable. If you want the best canned vegetables, you must put them up the same way.

But as far as the broccoli is concerned, we take a good many of the heads that are too small for the market. I think that a crate weighs about fifty-five pounds, and when it is trimmed ready for canning we would only get about twenty-five pounds out of it. It is worth to the canning company about a cent and a half a pound as a canning proposition. Perhaps they want something like seventy-five cents a crate, and by the time you got it ready for canning, it would probably cost about four cents a pound.

Western Oregon and Washington produce wonderfully fine vegetables both in flavor and texture. I believe it will not be many years before the canning of vegetables will be one of our very important industries. These goods compete with the fresh article and must be sold as cheaply as possible. We must have quantity, production and cheap freight rates to our markets.

Mr. Bailey: I would like to ask Mr. Holt if there is any objection to bleaching the broccoli with sulphur before it is canned.

Mr. Holt: No, I think there would be no objection; doubtless that could be done.

Mr. Bailey: All I know about it, Mr. Holt, is that there are some who complained to the local cannery, as I understand it, and I think there was some objection raised by the Government that they had been bleaching by sulphur.

Mr. Holt: I never knew a cannery man to bleach a thing with sulphur. The only thing that a cannery used in the canning process is sugar and salt. I never saw anyone do it, so I don't know what effect it would have.

Mr. Bailey: Is there anyone who would like to ask Mr. Holt anything about the canning of broccoli?

If there is nothing further on that question, we will go on to The Growing of Broccoli Seed, by Mr. C. W. Kruse, of Oswego.

THE GROWING OF BROCCOLI SEED

By C. W. Kruse, Oswego, Oregon.

As near as I can recollect broccoli was introduced about 25 years ago. The plants were very different from the present ones. They stood high (many three feet) and had short curly leaves about the heads which furnished very little protection. The heads were quite small, of a yellowish cast with many short leaves among the prongs or sections. It was not well received, there being little market for it and its inferior quality made it an undesirable crop taken together with the hazard of frost.

After several years of experimenting it was discovered that there was much difference in the crops. The seed seemed to have no fixed standard of type; but seedsmen were gradually improving the strain from year to year and (I presume about ten years later) I remember a shorter, whiter and much-improved plant was raised. It was so much better than the former ones that it was decided to try and raise seed from them, which are the direct ancestors of the seed I now grow. Although the St. Valentine is the nearest type to it, so far as I know they are not related, yet I think the Valentine has been brought up along the same lines.

In growing seed, with the aim of standardizing it so it will produce like to its progenitor, you must follow the same principle in many ways as the livestock breeder. Bear in mind that a typical plant saved for seed which was borne upon a stalk that also produced culls will itself produce culls, but they should be somewhat fewer. By proper selection of type and using care that inferior plants do not mix with it or other plants of like botanical nature, you should each year improve the strain. Plants which have 15 years of perfect ancestry back of them may produce 95 per cent crop when the plants of one year's selection may run as low as 10 per cent crop. I do not mean to say by 15 years of perfect ancestry that there were no culls along the line; there are always culls, but not in direct line.

There seems to be in all plant life a certain tendency to variation. It is the taking advantage of this slight degree of difference which enables us to improve upon nature. Nature in its infinite wisdom has left the door partly open for man's ingenuity to grasp what he may, although there are many things behind the door which are not visible and not handed out. There are so many things to be taken into consideration in the production of broccoli seed that one is very apt to make a mistake in the selection of a standard or the plant from which he desires to grow seed for improvement. In the first place, you can be guided only by looks, but as time rolls on you discover some heads have a better keeping quality; others are better protected from sun and frosts; others are whiter; others are more compact and others have shorter stalks which are better to resist frosts in winter. Now, the problem is how to combine all these qualities and many others to the best advantage and lose none of them. It takes time, so be patient; cross them in a way and in proportion which you think will produce the best results and be careful that no other mixtures get in by the busy bee who is always ready to undo your work, and set you back. I have about \$50 worth of mosquito gauze which I find a fine thing to place over the row of seed plants during blooming time. Even then

an occasional bee will poke his proboscis through the gauze and reach a bloom that is pressed against it.

I have found a different type of plant can be used in different localities. If well to the north where winter frosts are severe, one should select short stems, not too large and pithy, and also slow heading kind with dark green leaves; in fact, a tough plant. Further south where there is no danger of winter killing the tender plant can be used with good results, which usually produces a larger head, comes earlier and looks whiter, but is not as good a keeper.

Transplanting the selected plants is a delicate job which should be done while cloudy weather prevails, and even then they should be shaded for a long time, and as much earth left on them as will hold. Give them good cultivation and put them on a high place to avoid night frosts in April. Old cement barrels are a good thing to set over the plants if there is danger of frost.

Tie a string around each plant after the blooms have fallen to prevent the weak stems from lopping down, which will cut off the sap at the kink and prevent the seed from filling.

Look out for birds. The red-head thrush will camp with your seed plants in great numbers, when about ripe, and do great mischief. Gather as soon as ripe to avoid shelling out.

SOIL PACKING—PREVENTION AND RESTORATION.

By C. W. Kruse, Oswego, Oregon.

As the process of restoring packed soil to a mellow state does not in any way relate to the process whereby it is packed, you cannot undo it by backing up as one would unravel a piece of knitting to arrive at the beginning; or, if being injured by falling headlong over a log one might reason that to fall backwards over the log might remedy the injury. Some things can be handled on that theory. For instance, a lazy man who is seeking an excuse to quit picking blackberries when his wife wants a few to can—but not packed soil.

Anyone without much thought can easily pack a field by mudding around in it, and the nearer this is done to the time when dry weather sets in the better the job will be. The first thing one should consider is prevention as far as possible, because restoration is a slow and tedious process, especially on black, low soils that tend to be mucky.

However, before going into preventions or remedies, let us be sure we know how to pack soil in the various ways. Late spring plowing, when the ground is too wet and already laying heavy, done just before a dry windy spell of weather, is usually considered to be one of the best ways to pack soil; but I will tell you this is only a small part of it. Of course, it is a wrong start, but most times the job of soil packing gets the "final wallup" when the harrowing is done too soon. The farmer thinks the clods are going to give him a "heap of trouble" if he doesn't break them before they get too dry, consequently he goes on as soon as the surface looks good, and while he is making two or three inches of the top soil look good to the eye he is packing a greater thickness just below this layer by the horses' hoofs stamping the air out of the ground and pressing the soil so as to facilitate its natural cementing quality, which take place before the

plant roots have access to it, or, perhaps, plants have not yet been put out, which if out leaves the roots to search around in the few inches of mellow soil on top and when dry weather sets in they find themselves standing on the surface, which soon dries out and they are done unless favored by an early fall rain.

If you will grow vegetables or even many other crops you must have air together with moisture and fertility, which means fine loose ground to a great depth and planted immediately after preparation so the little tender roots can ramify downward and to the greatest possible distance before the soil settles and its particles begin to adhere and obstruct their growth.

Remember, if you keep moisture without air your crop will be a failure, also unless you are growing swamp-grass, nettles, skunk cabbage, or something that desires wet feet.

The school of experience has charged me a fair price for many of my experiments on handling soil. I once had about four acres of very rich soil which had been fall plowed. I wanted to plant this field to cauliflower. I thought that, by starting early and keeping it mellow and fine on the surface, I would retain much moisture as a store to resist the dry weather period. Accordingly I went over it with a four-horse disc, cutting as deeply as possible—doing this in the latter part of April. Although the surface was dry, the soil clogged between the discs and I had to frequently dig it out. I gave this field about three discings, drag harrowing and clod-mashing about thirty days between each set of operations and had a surface that would please the eye to look upon, with an abundance of moisture right up to the very top at planting time about July 1. I finished planting in good shape and everything looked promising until about the first of August when the plants came to a standstill and I discovered that the soil would not hold moisture; it really had no dust on the surface; it was just fine and mealy. The plants were drying out and I was powerless to help them. I made a one-horse float, on which I stood, and went through the rows, but to no avail as the soil beneath each plant was caked and hard; my horses had done this while I was preparing the surface—I was spoiling the lower soil. This was about twenty years ago. I have since seen a great deal of soil packing by other farmers who thought it was necessary to hold moisture, but in reality it proved a sad mistake.

The continual working of soil to make it fine in order to hold moisture is sure to cause it to run together and be slower to loosen up the following year. It is inclined to grow steadily worse year by year as truck crops are grown and how to avoid this condition or overcome it as far as possible is one of the greatest problems of the garden truck farmer.

In the production of broccoli you cannot avoid going upon the land to harvest your crop; but step as lightly as you can, or, in plain words, don't take a heavy wagon and two big horses out astride the row and haul the broccoli out, when you can make a hopper rig out of an old eight-foot hay rake and put one horse to it and go astride two four-foot rows cutting at least four rows at a swath. Two men can follow behind cutting two rows each or three rows each as desired, allowing the muzzled horse to go and stop at call. The advantage is a light rig, a high rig, and the cutters walking so as to look right into the heads without unnecessary movements. The heads can be laid into

the hopper without damage by bruising, which should be large enough to hold ten dozen. There is no better or easier way.

When the crop is off take a disc harrow and go astride each row. The two center discs will split or cut the stalks up so that they can be plowed under; but don't work too wet. Then take an 18-inch plow with a good substantial jointer on it, and plow deep and keep straight with the rows, managing to plow right up to each row as you come to it, so when the next furrow is plowed the jointer will run just to the left of the broccoli stalks. This will give them a complete turn over and cover. You cannot cross back and forth through the broccoli row with your jointer and make a job of it. The rows must necessarily be straight. By covering the leaves and stalks well under they will soon rot except just a small woody portion of the stalks. Keep off this field now, if not too many weeds come up, until after the June rains have slacked the surface. Let it first get dry and by being rough few weeds will grow. If, however, they appear, run over when they first germinate with a drag harrow with the teeth well slanted back so as to prevent jerking out the broccoli stalks. About June 25 or July 1 run over with a drag harrow and heavy clod-masher, then follow with a disc and you will be surprised how few "clubs" you will find; but be sure to mash all the clods before discing as afterwards they will sink into the loose soil and not mash.

No clod-masher is heavy enough to pack soil, and by discing the dry surface under and exposing fresh soil, which can be easily handled before getting too dry, you will be in no danger of packing the soil. You have no business being in the field with a disc harrow after June 1 if you need cleaners. In fact, a cloud of dust should follow your clod-masher. You may imagine your soil is so dry that no moisture will ever come back, but just get two or three inches of dust mulch as fine as flour on the surface and in two or three weeks you will be surprised how the old earth can sweat under such torture. This moisture that steams up during the hot days and is condensed under the blanket of dust by the cool nights is incomparably better than rain water, as it brings fertility up from the subsoil with it which has been washed down during the wet periods. In this manner you may take a field of dry ground, and the longer it has been dry the better, because you must know that clods have to go through a slacking process which can only be accomplished by having them perfectly dry to the heart; let them get so dry and compact that, literally speaking, they are in great agony. This condition fits them for decomposition. Too much harrowing prevents you from getting much of the surface dry. Now they are ready for turning into dust, and dust you must have. Harrow and slide them down and if possible to get a light rain on the surface which does not penetrate more than two or three inches they will retain some of this moisture long enough for you to give them another going over and this time they will be both air slacked and water slacked. Bear in mind you cannot slack clods with water only; if you do, the particles will not be fine like dust and later your moisture will escape which you thought you were conserving.

To accomplish the best results much depends on how good a manager you are and how the season favors you. There are times when one-half day's work if put in when conditions are right will accomplish more than two or three days of hard clod grinding under improper conditions. Of course, you must be prepared and act quickly

under favorable conditions or else be a "good sport" and also prepared to just grind the clods by sheer force of weight if the time has passed by or never came.

Rollers are of very little value. I have a 10-foot clod-masher with a hinge in the center to which I hitch six horses and shovel about one ton of dirt on it in bad cases. It has a way of its own in putting its ear right down to the ground so it can hear the grumbling of the clods as they powder out behind while it communicates to them how to do it. Don't forget, it takes power to force clods to yield. I also have a 24-tooth spring-tooth harrow which four horses cannot run when set eight or ten inches deep. I have this so I can get below horse track depth as much as possible, and also to hook up any chunks which need pulverizing. Here is where I get the air in the ground; and instead of having three or four inches of mulch I have eight or ten, which furnishes a root bed as well.

There are some kinds of soils which will not respond to any ordinary methods. An abundance of straw plowed under in the fall will help a great deal and something should be kept growing during the winter on such land. This will keep the soil loose, prevent washing, and retain as much fertility as the plants hold. Yet with all you can do it will be necessary to give the soil a change for other reasons than clods. If broccoli or cabbage is grown continuously on the same field the keeping qualities will deteriorate and necessitate the use of potash to give them firmness.

I class buckwheat as king of all crops to bring back packed soil. Its fine roots have a way of ramifying in all directions and possibly the acid from their decayed state helps to separate the atoms of the soil; anyhow, let it be as it may, the results are forthcoming and the straw rots exceptionally quick. If you do not care to harvest the crop, plow it under in the fall after the grain has sprouted. (Better run over with a disc to insure sprouting so as to avoid volunteering). Sow vetch and let it stand late next spring—say about May 1, and plow it well under with a jointer when the soil is rather dry. Plow as shallow as you can to get a good job of it. Later disc as deep as you can—say about June 15—and be sure to cut through all the vetch plowed under and turn as much as possible of it to the surface. Most men fail because they do not have heavy enough equipment to cut deep. I have a 20-inch disc harrow, and wish it was 24 inches. The 16-inch discs are a plaything and a bluff at the job.

If you have a strata of vegetation between the surface and subsoil you will be stung at harvest time in proportion to the thickness of the strata which prevents the soil from holding moisture above it.

I believe land plaster causes the soil to become sticky. Sand is what the soil really needs. I have a piece of low, black, sticky soil. I allow the wash from the fields above to run in on it, which has greatly improved it.

Tile draining is one of the most beneficial things to soil as it prevents the filling up with water in winter. By lowering the water level the air is allowed to penetrate deeper which keeps the soil mellow. You will find 50 per cent less clods over or near the tiles than between them if laid too far apart. I have laid several miles of tile and have no cause to regret the expense. The length of the season for working the soil is more than doubled and the harvesting period is made comfortable and safer with many crops as well as preventing soil

injury. I have seen that plants standing upon wet soil receive far more injury from frost than those standing on drier soil. They have a slow way to recuperate when the thaw comes on.

Big tough plants are necessary, well hardened and long tap roots, so they can be set deep. Late planting is preferable on account of frosts. Spray the beds for aphids prevention. Dip the plants by placing in box with perforated lid. Use soap.

Mr. Bailey: Any questions anyone would like to ask Mr. Kruse on the Growing of Broccoli Seed?

Mr. Bailey: I would like to ask everybody in the house who is not a resident of Douglas county to stand just a moment while we count you. (Twenty-six standing).

Mr. Kruse: In setting the plant, I want to leave a tap root on. I want my tap root to be six inches long at least so that when you do your dry farming the dry weather can't reach them, and I put them down so they can stand much more shock in transplanting. In regard to aphids, I think that question has been amply answered by our chairman; though perhaps I would suggest a different way to dip them. I put them in a tub, all of them, and then we have a perforated lid that we put over the top and turn the whole tub upside down into a tub or tank of water, so the water will find its level; just so that the water don't quite reach the roots. I don't know that there is anything more that I can think of at the present moment. If, however, you don't agree with me in this particular you can get up and say so. I am willing to be criticized and questioned as severely as you wish. If there is anything that you desire to have explained, just ask me and see if I can answer you.

Mr. Bradford: I would like to ask what time of the year you sow your buckwheat.

Mr. Kruse: You can sow buckwheat at any time when you feel safe that it won't frost or freeze. Just as quick as the potato or tomato. As soon as you can work the soil then you can sow it with reasonable safety, which will be about the 10th of May. You might sow it the first of May, but I think your buckwheat will give you a better yield—give you a better crop if sown almost as late as the first of June, or the middle of June. It seems to be a warm weather crop. It don't come up good if it is too cold, and the crop is thin in places, and it has little heads.

Mr. Bailey: Do you ever use the Japanese variety?

Mr. Kruse: That is fairly good.

Mr. Bailey: Has it the same value as a fertilizer?

Mr. Kruse: Yes, about the same value, where the roots go through the soil.

Mr. Carter: I would like to ask Mr. Kruse what the nature of his soil is? What is it, loose soil, or free soil, or heavy?

Mr. Kruse: Mixed, black. We have 125 acres that we cultivate but there is perhaps out of the whole lot not more than ten acres that

you can work easily, and the rest of it is average land, but it is very good—I presume it is about like Mr. Curtis' land or Mr. Cooley's.

Mr. Curtis: No free soil, then?

Mr. Kruse: Yes, we don't try to raise broccoli on black soil for this reason: While we could get an admirable plant and a big plant—a larger plant, that looks better than any of the hill land plants up to, say the winter, but the soil at that time, unless it is well tile-drained, holds too much water and the broccoli does not thrive, and will not make a good crop. We have a hard sub-soil under our land, and I am told that here you have a loose, open sub-soil that water can run right out, and in that case you probably can raise broccoli on reasonably low soil.

Mr. Curtis: One more question. What time do you have your last rains, about?

Mr. Kruse: We usually have them from June 25th to July 4th. I think it is about the same here, isn't it? There is one thing about planting out broccoli—the time we usually plant it. You plant it here about the first of July, or last of June. I think these are the dates in this locality. If we plant them out about July 1st, these plants grow up and make a big root, and look much better than later plants, but a little later on we find that three or four leaves on the bottom, underneath, turn yellow, while the tender plant that was planted the first of August or the 25th of July, has no yellow leaves on it, and is going to stand up in a short time. Invariably the earlier plant that is old, goes without water without injury when resetting, while the others will wilt. We do not plant before the 25th of July if we can avoid it. Now, if the soil is poor—I think you cannot raise good broccoli anywhere on poor soil. I believe five acres of good broccoli has more value than ten acres of poor—in fact, it is worth more than twenty, because you get more for your crop.

Mr. Curtis: One more question. I would like to ask you when you commence to harvest your crop?

Mr. Kruse: Well, of course the harvest varies a good deal, so that we haven't any rule. We have to go according to the season. Last winter the broccoli grew just as though it was summer weather, you might say, right through the winter. I guess yours did the same. And we had a frost on the 28th of January, and we had just cut one load of extra nice broccoli when this frost came, and we never cut another good load of broccoli after that. There were many plants that had the black rot, which the frost causes. You can see that frozen broccoli hasn't got the keeping quality. It is like frozen onions, it hasn't got the keeping quality when it has been frosted, and the size is smaller, so that it is practically of no value. It grows after a frost, but I don't think the keeping quality is present.

Question: What did you say causes that?

Mr. Kruse: I didn't say. I don't know. We cut one load the night before the 27th of January, and that was all the broccoli we got that year. As a rule the cutting time with us is from the 20th of March up to as late as about the 15th of April. I understand you have it from about the middle of February to the first of March. Now, in

regard to setting the plants out. I put them down so as to prevent a long stem. The further you put the plants in the ground you have cheated them out of that much elevation. A short plant can stand the frost better.

Question: You sow your seed at what time?

Mr. Kruse: The first of May, and they must be kept growing right along.

Mr. Harvey: How do you set the plants out—with a planter?

Mr. Kruse: Now, that is what I was coming to. We mark both ways, three by four feet, and we set by hand, and have only a spade. Down goes the spade, and the fellow on the other side puts the plant in, and we kick the soil back in place. One can stick probably 3000 plants in a day with the help of a boy. With a long handled spade and one boy. The ground should be loosened with a very light, little spade. Just put your foot down and bring it up a little, and the boy sticks the plant in, and you kick the dirt back in place with your foot, and go on to the next one.

Mr. Minton: Do you use water?

Mr. Kruse: We use absolutely no water. Of course if you have your bed mellow, when you take up the plants there is always a little dirt that clings to them, and that dirt is sufficient to hold the plant until it can take hold in the soil. If the soil is properly prepared the moisture will be sufficiently near the surface for the tap root to reach down to it, and wherever moisture is the plant will thrive. You can cut away part of the leaf system, and it will still be healthy.

Mr. Bradford: Concerning the sowing of buckwheat, do you use a drill to put it in?

Mr. Kruse: Yes. A peck will sow an acre. It is not very expensive to sow it.

Mr. Cooley: I am asking too many questions, perhaps, but this is in regard to the soil. He hasn't got so many kinds of soil to the acre in his valley as we have down here. He has told us how to plant broccoli in his soil. We have got all kinds of soils here, but not the loose free soil with the gravel bottom, which he says he has and the water all goes out. Now, if we get the moisture out of the top four or five inches it might as well be four or five feet. I would like to have him tell us something about soil of that kind.

Mr. Kruse: I can't be certain that I know just what you mean, but it is always well to work your soil. That might not make a hit with all of your soil, but I think I could bring the moisture back to some of your soil. I didn't dig into the sub-soil, but from all appearances there isn't a great deal of difference. The thing is to get this clay crumbled and mashed and decomposed. That is, the fresh clay, before it gets too dry to mash it.

Mr. Cooley: Of course we don't try to work it when we have to have a chain on our disc, and our plow and such tools. If we keep it fine we can get a dry mulch on top, but if we wait too long to get a dry mulch on top, we find it is dry down below, and we can get four

or five inches, or three or four inches of good dry dirt on top, but it is too dry down below—that is, to get the best results. We want to get it here so that when we go along with our foot and kick up two or three inches of dry dirt on top we are going to find moisture, but the moisture is usually lacking before we get it to going nicely. We have plenty of dust here to mulch, but it is not at the time when we want it.

Mr. Kruse: In regard to moisture, I will tell you of an experience I had last year. I had got behind with my farm work up till about the last of May or the first of June. I had quite a large acreage that we used for our early crop, so we planted it to cauliflower, and we had heads there three feet high, some of it. We had had no rain and it was getting drier right along, and we could only plow about six or seven inches deep, but I wasn't going to back out, and after plowing it, we went over it with a harrow and a clod masher and followed that immediately with the disc and a big spring tooth, and kept working at it till we brought all the moisture to the top again, but I was going to plant—I was going to force the issue, and we did. We proceeded to plant about the twentieth—I think it was about the twentieth that we got that soil ready, and I never did see anything like the crop of cauliflower that I raised on that ground, and that ground was apparently as dry as anything could be. We could hardly see any moisture when we were working it, but in a short time the moisture came up and we had a good piece of ground ready. You don't need to have much moisture in the soil in order to plant; if you work it properly you will be all right. We had a 100 per cent crop of cauliflower until about the last of September, though we were short on our usual fall rain, and when we don't have the rain we have got to expect the earth to furnish the moisture from below. The crop would have been a failure if I had prepared the soil in any other way.

Mr. Cooley: I want to ask one thing more. I consider that Mr. Kruse is a leading authority on broccoli growing in the state, and I am particularly anxious to know about growing the plants. I have been very particular about growing the plants—getting the plants ready to set out, and I would like to have his experience and information on that subject.

Mr. Kruse: I will tell you one thing that might save trouble. In the first place we have a lot of poor seed beds for broccoli, but if we have a pretty rich seed bed the plants will dry out too much, but the plants must be thrifty and you can do it only by having the proper bed for them. You must get the bed as moist as possible, and as fine as can be, and I put the seed to soak the night before, and let them soak as long as they will absorb the water, and then take them out and put them in the sun in a pan or something, and scatter them and let them partially dry out till they get so they won't stick together, but will roll around, each one separately, and after drying them down so they will roll around in the pan, and when there is just enough moisture left—I usually shake them around till they will just about adhere, and then I use lime sprinkled on them and let them dry out a little more. Then when you get your bed well saturated with moisture, you can sow them, and you can see them on the ground, and you can see just how thick you are putting them. You should make your bed smooth with a flat surface of some kind, so you can see the surface when you sow the seed. The seed should be an inch apart, and they

will come up two days quicker if they are watered the second day. I put a blanket or old piece of cloth over these beds and leave it there four days after the seed is sowed. That gathers the moisture, or holds the moisture, until they are germinated, and you will get a much better germination if you do it. In fact, there are times when you almost have to do it.

Question: How deep do you plant cauliflower seed?

Mr. Kruse: About half an inch, if you want to be sure of the best possible plants. Of course any man who isn't afraid to work may do this. Sow your seed on top of the soil, after you have prepared the bed, and then have a supply of fine earth, and sow this on top of the seed to a certain depth—say a quarter of an inch—then you have got every seed covered to the same depth, and then you put your blanket on to cover it—then you know you have got every seed in the ground, but if you do it otherwise and then rake it in, there is a certain percentage of it lying on top that never can germinate.

Question: You sow your cauliflower and your broccoli about the same thickness? About the same amount of seed?

Mr. Kruse: Yes, just about. The cauliflower I try to sow a little thicker than the broccoli, because the cauliflower plant is the most particular plant—that is, the tenderest and hardest to grow, and if they are thick they have a way of elongating in growing, and that makes it easier about transplanting. If they are stubby, they are harder to transplant. The broccoli plant is more inclined to grow, and that makes it a most admirable plant to transplant—better than the cabbage.

Question: You sow the seed of both plants at the same time?

Mr. Kruse: O, no. I would sow cabbage and broccoli about the same time, but cauliflower, I think, ought not to be over thirty days out of the ground before transplanting. It ought to be very small, and they should be kept growing right from the time of germination till they are cut, but they cannot be disced like the broccoli. They can be disced some, but not a great deal.

Question: What variety of cauliflower seed do you use?

Mr. Kruse: I have planted a good many varieties. We prefer the Snowball. It is an early variety that we use principally. Then there is the Gilt Edge and Burpee's Best Early. There is very little difference between them. And Buckbee's Chief.

Question: About when do they begin to head?

Mr. Kruse: A cauliflower planted out say from the 10th of July to the 20th of July should begin to head the 15th of September, and run on till the 1st of December, but you can't go by that. They seem to date from the time the fall rains strikes them more than anything else. In fact, there is no rule for the crop.

Question: When do you sow your cauliflower seed?

Mr. Kruse: About the 15th of May or the 1st of June. Often later than that. I have sown it as late as the 20th of June and got

good results. We put gauze on all the seed beds. We put a board along side of the bed, and put the gauze along on the boards, and we keep this gauze on them, and that keeps the bees out of your broccoli bed.

About black leaf 40 I find that the best thing I can use to keep maggots or beetles from eating them.

Mr. Cooley: What do you do with your aphids?

Mr. Kruse: Well, sir, that is strictly work. If you can get the aphids off at the start, that is the best plan. When the plants are little, this turning them upside down and soaking them is the best thing that I can think of, for the reason that if you set your bed and spray your liquid on the plants after this, you only get those on the upper side of the leaf, and the aphids will take the under side of the leaf. If you only get those on top of the leaf, that isn't worth while, and if you were to take the nozzle and get down underneath and try to get them that way, you might as well quit raising cabbage—there isn't money enough in it, but when the fall rains come the aphids generally leave.

Mr. Worsley: If the root maggots get started in the roots of your plants, they say the black leaf 40 is the only remedy.

Mr. Kruse: I wouldn't want to try it around the roots—black leaf 40.

Mr. Worsley: The black leaf 40 is no good for root maggots?

Mr. Kruse: If root maggots get into the plant or into the ground you might just as well pull it up. However, if you will search diligently you probably can find the little grub attached to the stem, and you can give him a shot of your black leaf 40. First give the plant a kick to make an opening along the stem for your liquid to penetrate beneath the cast that the maggot is forming. But you must not get the mixture too strong—about 1 to 300, or you will not only kill the maggot, but your plant. After a plant once starts showing yellow leaves you might as well pull it up. All these methods require so much work as to not be worth while. As soon as you see any indications of the maggot working, if you will draw the plant to one side and put hard wood ashes around it that will get the root maggot—they will do little more eating down that stem. If you have no maggots here, you can consider yourselves blessed in that particular then. You may have other root pests here, but they are nothing as compared with the maggot.

Mr. Bailey: The meeting will be adjourned until 2:30 this afternoon.

FRIDAY, December 6

AFTERNOON SESSION.

Meeting called to order at 2:30 P. M. by President Bailey.

Professor Lewis was scheduled for tomorrow, but he has to be away from Roseburg some time tonight, and we are going to ask for Professor Lewis' paper at this time.

DETERIORATION OF FRUIT AT PICKING TIME

By Prof. C. I. Lewis, Vice-Director and Chief in Horticulture, O. A. C.

During the past two falls there has been a general complaint from the fruit growers of Oregon that much of their fruit was deteriorating prematurely. The deteriorations in question are varied in their character, and can be attributed to two chief causes; first, climatic; and, second, to cultural or orchard methods. We must remember that the Pacific Northwest has had two of the driest seasons in its history and that the past seasons have not only been unusually dry but very hot. Strange as it may seem, September, our early harvesting month, was the hottest month of the entire year; in fact, it was so hot for several days during September that much of the fruit was severely burned on the tree. Under such conditions we may naturally expect certain deteriorations or troubles to arise.

To make matters worse, we have coupled unfavorable climatic conditions with careless tillage, irrigation, spraying, etc., encouraging such trouble to become aggravated and more severe. Again, severe drouth has caused an early maturity of the fruit and in some cases we might say premature maturity of the fruit; in fact, many apples which ordinarily do not mature until the middle or latter part of September should have been picked this last season the latter part of August or the first of September. Yet many growers failed to sense the difference in the condition of their fruit and allowed the fruit to hang on the trees far too late. If there is one general criticism that I would make of the apple growers of the Pacific Northwest as regards the time and methods of harvesting their apples, I would say that it is that we pick our apples too late—especially our summer, fall, and early winter varieties. We are so anxious to secure the maximum of color that we allow the fruit to deteriorate before we take it from the trees. During unusually hot and dry seasons as we have just past the color does not develop as much as normally and when color does come on it seems to come very late. A few rains in the fall, a sharp frost, and general changes in the weather encourage the formation of color on the fruit more than hot dry weather. There is no question at all but what a large percentage of such varieties as Gravensteins, Grimes, Winter Banana, Jonathan, and Spitzenbergs were allowed to hang on the trees far too long this past fall and in a few cases where

the trees have suffered from drouth even some of our varieties like the Yellow Newtowns were allowed to remain beyond the proper date for picking. Owing to the lateness in picking, some varieties of apples seem to have a tendency to develop a sort of core rot or decay just around the core. This trouble is seemingly more pronounced in such varieties as the Jonathan, Delicious, Gravenstein, and Ortley. Some varieties have a tendency to develop a premature mellowness, or dryness, become devoid of juice, and unpalatable. This condition is almost invariably due to over-maturity on the trees and commonly attacks such varieties as Spitzenbergs, Jonathans, Baldwins, Delicious, and Wageners; in fact, nearly all of the fall and early winter varieties are subject to this deterioration.

Cracking of the fruit was quite pronounced this past year, and as far as apples are concerned this cracking seems to be due very largely to early maturity. In tillage experiments and irrigation experiments we have conducted, we have found the check plots were the ones that suffered the most from cracking either the calyx or about the stem. This was due partly to the fact that the dry checks matured their fruit earlier, and it should have been picked sooner than we generally practice. You are all aware how Red Astrachan apples will crack when they are over developed on the trees. This cracking seems to have attacked nearly all varieties, especially where they are suffering for want of moisture, and the later the fruit hangs on the tree the more serious becomes the cracking. Cracking will sometimes occur on fruit after it is packed and stored. This is apt to be associated with fruit that has been kept too long. Such specimens generally have a mealiness or dryness of flesh. Also overgrown specimens are subject to this trouble.

The cracking of some of our soft fruits like cherries, prunes, etc., seems to be due to an entirely different cause and it is generally found to be worse right immediately after a heavy rain. During this past season, especially in the drier sections, there has been some trouble from drouth spots, cork, and similar troubles which are closely associated and which all seem to have their origin in a lack of moisture or food for the tree. As the season advances these troubles seem to become more and more aggravated since the trees are suffering more and more for want of moisture. With many of our red apples as the Spitzenberg, Jonathan, and Baldwin there is a noticeable spotting on the flesh and a slight depression takes place and very soon becomes dark. This condition is very commonly known as the Jonathan spot and it is certainly aggravated by allowing the fruit to stay on the trees too long and, secondly, by keeping the fruit in poorly ventilated places after it is harvested. Over maturity plus poor storage will cause the appearance of much of this trouble.

There has been a great deal of so-called fruit pit, dry rot, etc., during the past year. Investigators in Australia, the United States, and Europe have been working many years on this problem. None so far have carried their investigations to a point where they can definitely explain the appearance of this trouble under all conditions. All are satisfied that it is functional and due to some disturbance in the nutrition and moisture supply of the tree. In our work in the Hood River Valley, since 1912, we have been able to eliminate to a very large extent much of these troubles. This has been brought about by giving the soil more nitrogen, encouraging the growing of alfalfa and clover, and encouraging a little more careful study of irrigation and avoiding excessive irrigation on the one hand or lack of irrigation on the other.

Not only has such a condition eliminated a large amount of fruit pit but has likewise eliminated a great deal of so-called rosette, little leaf, or die-back. Abnormal trees seem to be affected more than those in normal conditions; that is, a tree that is growing too vigorously and producing over-grown fruit generally has a good deal of fruit pit. Likewise a tree which has fruit that is very small and poorly developed often has the fruit badly pitted. Again, some varieties are attacked worse than others. The Baldwin is a regular customer; in fact, so much so that it is doubtful if the Baldwin should be grown in any part of the Northwest. The Grimes is very seriously attacked by this trouble, but with the Grimes, Ortley, and Winter Banana, the specimens which seem to be attacked the worst are the overgrown specimens. In non-irrigated districts it would not be feasible to follow the plan we have used in the Hood River valley, but all that we can advise under such cases is to avoid any practice which tends to promote an abnormal condition in the trees. Try to follow good practices in tillage, pruning, etc., not allowing the trees to suffer on the one hand or to over-stimulate them on the other, and we believe that under such conditions there would be a reduction of fruit pit. In irrigated districts where the trees are bearing very heavily the growing of some crop among the trees and a careful study of irrigation will go a long ways toward the control of pit.

There has been an enormous amount of water-coring in the West during the past year. This trouble became so severe in some districts that some of the growers became greatly alarmed and discouraged. Water-coring is found every year, especially in some varieties. For example, the King of Tompkins County is very subject to its attacks and likewise the Wagener, Gravenstein, and Winter Banana, are pretty regularly attacked by this trouble. The late summer and early fall varieties suffer the most, and this last year we found the trouble extending into the early winter, and even the late winter varieties. In water-coring, the cells fill with water and large watery sections appear in the fruit. Where the water coring is not very bad and is confined to relatively small areas it is somewhat hard to detect unless one cuts the fruit with a knife. Where the water-coring becomes bad it begins to show on the outside of the fruit. First, the skin of the apple becomes a little rough and the surface slightly sunken, the fruit losing its smooth contour. Later the trouble advances to the stage where the water-coring itself shows on the outside of the fruit.

Like the fruit pit the largest specimens are apt to be the first attacked. The studies we have been able to make during the past years with this trouble indicate that over maturity is responsible for much of the water coring in a great deal of our fruit. Where varieties are picked at the proper time the water coring can be kept down to the minimum, but where varieties, like the Wagener, for example, are allowed to hang on the trees a week or so too long then one can expect a great deal of water coring to develop. Where any signs of water coring begin to develop the fruit should be picked off immediately. If the water coring has not been very bad much of it will disappear in storage. Excessive irrigation or a very heavy rain about the time the fruit is maturing seems to also encourage it. This has been often noted in the Pacific Northwest. Growers should watch the King, the Winter Banana, and Wagener very carefully, indeed, for the first indications of water core as this is one of the best signs that harvesting should be well under way.

A great many rots have developed in the apples the past year. Most of these can be attributed to one or two causes—the anthracnose spots on the one hand and the wormy apples on the other. Both of these troubles can be cured by spraying. Unfortunately, however, this past year the weather was so warm the codling moth seemed to come out over a very long period, the second brood appearing from early August until well into September so that it was only with great difficulty and care that one could keep down the percentage of wormy apples. Many growers were far too careless along this line and should they have gone into their orchards and done some spraying they could have saved much money. Likewise, the leaf roller was very bad on apples and even on some varieties of pears, but this is not a serious problem as it can be controlled by efficient spraying. There are sections of Oregon that will have to take the leaf roller into account this coming season.

Pear growers of the Pacific Northwest have been experiencing some trouble with their fruit. We have recently been conducting certain investigations on this subject. The first year's work has recently been published in the Experiment Station Bulletin, No. 154, entitled "A Preliminary Report on Pear Harvesting and Storage Investigations." The growers can secure copies of this bulletin by dropping a line to the Experiment Station (at Corvallis, Oregon). Before the harvesting time of another season arrives we will have a second report on this subject which will contain some very interesting data concerning a physical test for the picking of pears. Since this bulletin will be available to all growers and likewise Bulletin 154, I will not take the present time to elaborate on this problem, but refer you to this bulletin.

The prune growers have been having their troubles in the past year. Many of the orchards (especially older orchards) suffered greatly from the drouth. Some orchards planted on thin soil, trees that were attacked by borers, and orchards that were generally neglected, all showed the effects of the hot dry season. This was shown by an early deterioration of the fruit. It often became discolored, turning reddish, and large dark green areas which had a watery appearance and which often had little green drops on them were very noticeable on the prunes early in the summer. Some of the fruit developed nicely so that it could be evaporated, but a good deal of it did not and it dropped to the ground or was found unfit for use at the time of evaporating. In other cases, the fruit became greatly malformed and distorted. Large depressed areas were caused in the fruit and upon cutting the fruit through with a knife these areas were underlaid with a discolored portion of the flesh, often being brown in color. Large areas of the flesh often became dry, almost corky, and it was plain to see that the cells had broken down and that such fruit was a total loss. While there was a great fluctuation as regards the amount of this trouble it seemed to be fairly well correlated with thin soils, borers, and devitalized trees. There was much less of the trouble on the better soils or on trees that were shown to be in very good vigor. A few more cover crops and the addition of a little manure or nitrates and more intensive irrigation and cultivation would probably do much to rid the prune of such troubles.

The walnut growers have been experiencing this year considerable trouble with the condition which we call perforation. I have been in the state 13 years and this is the first time that we ever had very many samples sent in from Oregon. It is quite a common trouble with

some of the walnut growers in California. In perforation the shells of the walnut are very thin so that often the kernels are exposed. With perforation the meat and the skin on the kernel seem to develop normally and often the thin inner lining or inner shell covering the kernel, but the hard outer shell of the walnut seems to fail to develop. Thus we have a perforation. California writers who have had an opportunity to investigate this trouble tell us that there are probably two factors at work to help produce this condition, namely fertilization or pollination of the nuts during the blooming period and its nutrition during the growing season. In California perforation seems to be unusually abundant during dry years such as we have had in the past two years in the Northwest. They have also noticed that when the trees are badly attacked by the walnut aphid the trouble is aggravated. It does not attack all trees; sometimes only one or two trees in a row have this trouble while all the others seem to produce normal nuts. In some cases where pollination has been interfered with by continued dry weather or frost during the blooming period, perforation has apparently been more common. This latter statement, however, probably needs more investigation to be thoroughly verified. It would seem that the disease is probably due to the extreme drouth, the soil becoming so dry that the trees do not get food and moisture enough as the English walnut is a big feeder. Again, if a tree is attacked by aphid or other troubles which cut down the moisture supply even more we can expect the trouble to become more serious.

In conclusion, I feel that the growers of the Pacific Northwest need not feel discouraged because of the trouble they have had during the past two years. We must remember that the conditions were not normal and it is seldom that we have two years in succession like the past two. We have certainly learned that we must start our orchard cultivation and irrigation earlier and we must not allow the drouth to affect our trees as seriously as it has during the past year. Perhaps after all it will be more or less of a lesson encouraging us to a little better and more thorough orchard practice. Despite the various troubles enumerated our crop on the whole was good, prices excellent, and the growers, as a class, prosperous.

THE PEAR THE COMING FRUIT FOR WESTERN OREGON.

By M. McDonald, President Oregon Nursery Co., Orenco.

Mr. Chairman, Ladies and Gentlemen:

I have not been able to make out just why my name should appear on this program. It is true that your worthy secretary came out to our place a few weeks ago and asked me to prepare a paper on some subject. I have forgotten what it was about. At that time I told him I was too busy in the first place, and in the second place, I did not know anything about the subject and supposed that was the end of it. Now, what was my surprise when receiving one of the programs a day or two ago to find my name was down to read a paper on this subject. I am just as busy since I read the program as I was before. Since coming to Roseburg, I thought I would be able to steal a few minutes while you were out on your trip inspecting the broccoli, but your president insisted so cordially and urgently that I go along in

his auto, I abandoned even that last chance, and here I am before you with my subject, The Pear the Coming Fruit for Western Oregon.

Now, ladies and gentlemen, I am not a prophet, neither am I the son of a prophet, so I am not going to prophesy whether the pear is or is not the coming fruit for Western Oregon. I don't want to say what the future of the pear will be in Western Oregon. I don't believe I know, and more than that, I don't believe that any one else knows. However, the subject of the pear in Western Oregon is one that is worthy of our best study and investigation, and I believe there are many things we can say about the pear and do with it that will be of vital interest to horticulture.

In the first place, I think it is pretty well understood, and generally admitted, that the pear succeeds as well in Oregon and our coast country as it does in any other part of the United States, and that we have growing in these western valleys the greatest varieties of pears of any place in America. Therefore, this country must be well adapted for pear growing, and it follows that the subject should have a place in your deliberations. We have only recently been producing pears in such quantities in these valleys that we have been able to reach the commercial markets of the world; in fact, we have given but little attention to the subject of varieties, production and marketing of pears. It is true that in the Rogue River, and some of the other southern valleys, they have been growing pears in a commercial way and shipping in car lots, but throughout the state generally, I do not believe the same attention has been given to the pear that has been given to some other fruits.

It is one of the fruits that lends itself well to small acreage. It seems to thrive better in the back-door lot and out in the open than when growing in large orchards; and in these small back-door lots there is growing a great deal of fruit of splendid quality that never reaches the consumer. Our trouble seems to be that no adequate provision has been made for marketing it when grown in a limited way. True, in certain localities where canneries are established, the best of the fruit is taken, but thousands of tons of the most luscious of all fruits is allowed to go to waste every year for the lack of proper marketing facilities. We need better co-operative marketing systems for taking care of the production of the small grower, for every time a ton of pears, for instance, goes to waste, there is just so much wealth lost to the community for it is only when labor receives its just returns for the effort put forth that it can turn the result of that labor into the regular channels of trade and thereby add its part to the wealth of the nation as a whole.

We hear a great deal these days about creating positions agricultural for our boys when they come back from the front. We also hear a great deal about the back-to-the-soil movement for them. But people cannot live by just producing things from the soil. We must create the machinery that will convey these products, when grown, to the market that is hungry for them and return to the producer a fair amount for his labor and interest on his investment. Therefore, it would seem as if we ought to try to create conditions that will allow a man to plant and care for his trees and wait a reasonable time for them to come into bearing. As some of us grow older, we realize that it takes time to produce fruit profitably. In our earlier years, we had an idea that we could plant an orchard this year and next year harvest the crop. As time goes on, I believe we will more and more

come to a realization of the fact that the production of tree fruits is a permanent investment that takes years to come to full fruitage—an investment to hand down to our children.

To my mind, we are planting all of our orchard trees too close together. By the time they come into bearing, both roots and tops are inter-locking and soil exhaustion has already set in. The pear is a heavy producer under proper conditions and a gross feeder; consequently, when planted close together they soon exhaust the available plant food and are impoverished. If we are going to produce the pear at its best, we must extend the distance between the trees, allowing more soil area for each tree, and by so doing, produce larger crops and more money per acre.

In our western valleys and coast country there is none of our tree fruits that gives a surer annual crop than does the pear, and yet it has received but little attention in a general way. What I mean is, there is less information ready available for the use of the average planter than for other fruits. We want to know more about the pear; the best varieties to plant in different soils and different localities; the best kinds to plant for shipping and the best for canning.

It is my opinion that more attention should be given to the subject of canning the pear—that is, from the standpoint of the grower. It is true the canneryman knows all about what he wants from his standpoint. He makes arbitrary rules to protect his own interests without any regard for the interest of the producer or the consumer. To illustrate: Last season we had a very large crop of Bartletts, as fine fruit as ever grew, but on account of climatic conditions the fruit was not as large as usual and a large percentage did not come up to the standard set by the canneries. Consequently, there was no market for this undersized fruit, fruit that had just as good food values as the larger grade. The average consumer would be just as well served if the smaller size were canned and the producer would realize a profit instead of a loss. Better provision must be made to take care of the small producer in years when there is a surplus and the crop from climatic conditions does not come up to the usual standard. If orcharding is to be brought to its highest state of perfection, then fruit must be produced by the small grower, who, with the help of his own family, does all of his own work and harvests his own crop. He needs, and must have, assistance in marketing in a co-operative way. He must be allowed to get fair returns for his labor and investment, and this he cannot do under some of the arbitrary rulings made in regard to grades because he cannot always control conditions surrounding the growing of his crop. If the small grower is to be allowed to survive, we must devise some method that will assure him of a market in these off years when for some reason, climatic or otherwise, his crop has run largely below the standard rule established.

Mr. Bailey: I would like to give a little explanation of the program for this morning. There were to have been two men, Gordon G. Brown, Horticulturist, of Hood River, and Leroy Childs, Entomologist and Pathologist of the Hood River Experimental Station. Both of these men were unable to be present, but we have their papers here, and sometime tomorrow we are going to use these papers, if we don't get to them today.

SOME PRUNE FRUIT TROUBLES OF NON-PARASITIC NATURE

By Prof. H. P. Barss, Chief in Botany and Plant Pathology, O. A. C.

We have just passed through a remarkable season, quite out of the ordinary in many respects. This is certainly true from the standpoint of the plant doctor who has been watching conditions affecting the health of the crops in the state. There has been far less damage than usual from many of the commonest and ordinarily most destructive diseases but peculiar and unrecognized troubles have appeared and the help of the pathologist has been called for by scores and scores of farmers to diagnose and if possible prescribe a remedy for them. In the experience of the plant doctor climate is found to have a tremendous influence on the prevalence and severity of different diseases. He knows that a wet season will mean much financial loss to the growers on account of the multitude of microscopic parasites, mostly fungi of one kind or another, which attack vigorously and thrive well under moist conditions. On the other hand he is well aware that prolonged dry weather during the growing season favors very few of these commoner parasites and reduces materially the loss from diseases they cause. But such dry weather brings on many troubles of a non-parasitic nature which are often difficult of diagnosis and even more difficult of control. The season just past has felt the consequences of early and prolonged absence of rain and troubles of a non-parasitic nature have been conspicuous while those of parasitic origin like apple and pear scab, leaf spots, fire blight and brown rot have in general been far less severe than usual. The prune growers for the most part lost but little this year from that dreaded destroyer of fruit, the brown rot fungus, but in some sections they experienced losses from troubles of a non-parasitic sort and it is in order to throw a little more light if possible on the nature and peculiarities of such troubles that I am asked to talk a few minutes today. The conditions which have affected the prunes have also affected many other crops and I shall not attempt to confine myself strictly to the prune during this discussion.

We want first to get at the cause underlying the commoner non-parasitic disturbances about which we are interested, but first I wish to lead up to the subject by asking if any of you ever had to work in the harvest field on a roasting hot day after the water jug went dry? If so you know the distress, growing into anguish, which the worker feels when, without a drop to drink, he goes on laboring and sweating in the heat. It doesn't take a physician's examination to detect that something goes radically wrong in the human system under such circumstances. The thickened blood and sluggish circulation, the gradually decreased energy and dwindling ability to put forth effort, all indicate that the healthy functions of the body have been interfered with to a detrimental extent. Water is a very necessary thing for the human body, for its health and normal activities. Lack of water is very injurious to men and under conditions inducing excessive perspiration when a large amount of water is given off from the skin, it takes but a very short time if the water supply is inadequate to bring about a great change from the normal and healthy physiological state of the human system. In this respect what is true of the human being is true of all living things, vegetable as well as

animal. An abundant moisture supply is essential to health and a lack of it means internal disorder. The greatest number of genuinely non-parasitic diseases in plants are induced by disturbed water relations and it is this group of troubles we want to consider particularly today.

There is a very close analogy between the prune orchard under the blazing sun on a hot day in the middle of a long summer and the laborer in the harvest field under similar conditions. The man perspires freely and so does the tree, only scientists call it transpiration in the case of plant life instead of perspiration. The hotter the weather the more the human being sweats. The hotter and drier the weather the more abundantly the trees and all vegetation give off water. If the man brings with him a sufficient supply of water or can drink from a nearby spring when he is thirsty, all is well with him. A tree, however, cannot fetch water from a distance nor yet go after it, but rooted to the spot it must supply its needs from the soil at its feet and if it cannot get enough water to balance the amount given off from the foliage it must suffer.

Few of us realize, I think, the helplessness of the tree in the matter of adapting itself to meeting extreme conditions and we fail to appreciate the importance of assisting the tree where possible by our own intelligent efforts at these critical times. A tree gives off a surprising amount of water on a hot, dry day and is almost as much at the mercy of the atmosphere as far as anything it can do to stop this rapid loss of moisture as Monday's wash flapping in the sunshine on the clothesline. Dr. Ward in England once estimated that a single oak tree gave off through the foliage during five summer months over 600 barrels of water and a birch tree on a hot summer day was found to transpire to the extent of 14 to 18 barrels in 24 hours. According to this an acre of such trees would give off nearly 8,000 barrels in the course of a season. It has been figured that the grass in a hay field will give off six and one-half tons per acre daily average through a summer. I have not come across estimates on the water loss from fruit trees, but it is certainly probable that their rate of transpiration is not vastly different from that of other trees. To replenish the loss of water vapor from the leaves is the task which falls upon the root system. Under ordinary conditions the roots can meet the demand on them very well, but under drouth conditions let us see what happens.

Normally the growth and development of the root system keeps pace with that of the top of the tree and supplies that top with the amount of moisture required. The root system, however, cannot rapidly increase its rate of development to meet sudden and severe or prolonged periods of high foliar water loss with entire success and under climatic conditions which tend to exhaust the soil moisture rapidly without replenishment a task may be set for the root system which it is utterly incapable of performing. Then, like the harvest hand in our illustration the tree must suffer and the hotter the days and drier the air and soil the more pronounced become the outward evidences of that suffering.

Let us look at some of the effects on the tree of giving off water faster than the roots can easily replace it. First, there is a more or less wilted appearance or rolling of the foliage especially noticeable in the afternoon when the thirst is greatest. This may gradually become a fixed condition and the prune trees may show what growers term leaf roll or sometimes leaf curl, and this persists perhaps through

the balance of the season. Drouth is not the only cause of this phenomenon. Anything which interrupts or restricts the water supply to all or to any part of the top like root rot, borers, winter injury, and, most commonly of all, heart rot, may cause this appearance. Not only do the leaves roll up, but they also tend to assume a yellowish cast and in the severest cases this may be followed by a dropping of leaves which results in a reduction in the evaporating surface of the tree and helps in this way to preserve its life.

Now it appears to be self evident that the trees which commence a season by developing a large top and abundant foliage, unless they have an unusually extensive root system and a deep, water-retentive soil on which to draw, will suffer more in a season when the water supply is low and the rate of transpiration high than trees that enter the summer with a more moderate amount of foliage. The same principle holds with different seasons. In a year when abundant soil moisture and plenty of warm days early in the season induce a heavy foliage and shoot growth the effect from a later drouth period is much more severe than in years marked by early drouth with its natural retarding effect on leaf and twig development.

In 1918 in the Pacific Northwest the dry weather struck us at the very outset of the season, thus checking to some extent what might otherwise have been a very heavy production of new foliage. In view of the unparalleled long continuance of the drouth this was probably more fortunate than otherwise for the trees had a chance to adjust themselves at the beginning to the sort of climate which was to follow. Had this not been the case it is very likely that far greater damage would have resulted than orchardists actually experienced. As it was, prune men saw a heavy set and rapid development of the fruit. The tree paid more attention as it were to fruit production than to foliage production. As the season wore on, however, the warm, dry, bright weather continued practically unabated, gradually depleting the moisture from the soil without material help from precipitation in most sections. This brought on a time of testing. The tremendously active evaporation from the trees demanded heavy supplies of moisture from the roots. Eventually the demand became in some orchards greater than the roots of some of the trees could supply and evidences of trouble began to assert themselves.

It was some of the prune growers, I think, who first noticed trouble. During the last week in July and the first day or two in August there was, at least in the central Willamette Valley, a marked increase in the prevailing maximum temperature. This placed a critical strain on the orchards and within a very few days specimens of diseased prune fruits in considerable numbers were sent to the office of the Plant Pathologist at the Agricultural College and reports of damage came in from widely separated points in Western Oregon. My own opportunity for securing a thorough knowledge of the situation was limited by the lack of an opportunity to visit the orchard districts but from the information obtainable it was evident that considerable losses were being experienced here and there although there were many orchards that seemed scarcely to have been affected.

The first conclusion of the orchardists was that some sort of parasitic disease had struck the prunes. Careful examination of the specimens received indicated that such was not the case. It was very evidently some sort of non-parasitic trouble. The specimens showed varying degrees of injury. In some cases the prunes were

affected by what I have called for want of a better term "gum spot." Examination shows the exudation of gum through the skin of the green prune in one or more places or the collecting of gum within the flesh in spots which have a watery look through the skin. Cutting the fruit open we find little brown specks in the flesh always or nearly always in the region of the network of veins or sap conducting vessels lying a slight distance under the skin. It is evident that some force has caused a collapse or rupture of some of the cells and that this has been accompanied by the formation of more or less colorless gum which may accumulate in sufficient quantity to break through the skin under pressure and form on the outside as a glistening bead. This sort of trouble had been met with the season previous which had also been unusually dry, but in 1918 the amount of broken down tissue within the fruit seemed on the average much greater than before.

Most of the specimens received, however, showed a much more severe effect. The surface of the prune turned dark colored as though prematurely ripening. Irregular depressed areas were present over a greater or smaller portion of the fruit surface and gave the fruit an unnatural corrugated appearance. Upon opening up the flesh it was found to be brownish underneath the depressed spots, this browning of the tissues varying in amount from a small spot on one side of the fruit to a discoloration which might involve nearly the entire flesh. These tissues almost invariably gave off a disagreeable fermented or acid odor and the taste was extremely unpleasant. Study of the tissues showed a breaking down more or less like that in the gum spot condition but in extensive areas. No parasite was evident in the tissues and such fruit kept for weeks in the laboratory showed no increase in the size of the affected areas which would certainly not be the case if it were a true rot. The question naturally arises as to the cause and nature of the injury.

The circumstantial evidence points, I think, to a connection between these somewhat puzzling troubles and the drouth conditions of the season. At certain critical times it would seem that the water drawn out of the foliage on hot days was probably more than the root systems of individual trees in many of the orchards could successfully replenish and this does not necessarily imply that the soil was down to the lowest ebb of moisture content at such times. It simply means that under the conditions the demand was greater than the supply.

In orchards where the soil was poorly cared for and excessively dry or where the soil was shallow more trouble was reported than from soils that were deeper or better cared for. Hill tops suffered more than lower levels in many cases. Here extreme transpiration conditions naturally prevailed. Yet trouble was also experienced on well tilled soil and even on land that had been irrigated. Mr. C. E. Stewart in Lane county reported on an orchard where the trees that had received one irrigation early in July were nearly all affected later on. In this instance the soil was more or less gravelly. If my analysis of this situation is at all correct the trees were probably stimulated to abundant new growth by the early irrigation. Then when the critical time came the total draft of moisture from the heavy tops was greater than the roots in the gravelly soil could meet. In a very old orchard not far away with much better soil conditions the trees met the demand without any effect on the fruit even in two rows which had received irrigation. As would be expected with the vari-

ation in root systems and in soil conditions the individual trees in many orchards showed great differences in the amount of injury present. Some trees lost nearly all the crop, others half the crop, while even in the worst orchards there were usually scattered trees which showed little or no effects. Orchards with trees close together where there was great competition for soil moisture on the part of the root systems often showed considerable damage.

The conviction that there is a real connection between the dry season and the prevalence of these fruit troubles is considerably strengthened by the interesting discoveries which certain investigators have made in the last few years to which I wish to call your attention. Dr. W. H. Chandler working in Missouri on the water relations in various fruits found that when the normal water supply of a fruit-bearing branch was cut off the leaves would draw water from the fruit to supply the amount required for transpiration. He also found in several cases that the leaves would extract water much more readily from the immature than from the ripe fruit. His demonstrations included the cherry, plum, peach, apple, gooseberry, grape, cucumber, gourd and watermelon. In his tests the foliage withdrew moisture from the fruit until the fruit became greatly shrunken and shrivelled while the leaves maintained a normal and healthy appearance.

More recently Hodgson in California has demonstrated that in the citrus groves in certain sections of that state there is during hot weather a regular daily withdrawal of water from the growing fruit in the day time, this reaching a maximum in the afternoon, followed by a restoration of the water content at night when the roots are again able to supply moisture sufficient for the needs of the trees. Hodgson is inclined to think that the excessive drop of immature fruit in some of the California citrus orchards may possibly be accounted for on the grounds that in extremely hot periods the extraction of moisture from the fruit goes so far that the tree cannot restore the water loss completely and as a consequence cuts off the fruit and casts it on the ground. This suggests that periods of summer drop in prunes and other deciduous fruits may sometimes be attributable to similar causes.

At the Geneva Experiment Station Mix has done some valuable work on the effect of drouth on apples in New York and in the Wenatchee district of Washington Brooks and Fisher have studied the relation of abnormalities in the development of apple fruits to insufficient or irregular water supply at critical periods in the fruit growth. The peculiar external blotching known now as drouth spot and the development of corky spots or browned areas within the fruit have been definitely connected by these workers with conditions of excessive transpiration from the foliage and inadequate delivery of water by the root system or with sudden variations in the water balance within the trees. Mix has even succeeded in reproducing the drouth spot and occasionally spots resembling cork artificially by severing from the tree branches bearing both leaves and fruit, allowing the leaves to withdraw moisture from the fruit and then restoring the original state by placing the branches in water. The fruits thus treated show an appearance very similar to the corrugated appearance of the diseased prunes under discussion which is accompanied by the death and browning of cells in the vicinity of the network of veins as in the case also of our prunes.

There has been an unfortunate lack of extensive experimental work as yet on the effects of disturbed water relations on fruits of all kinds. We are thankful for the start made in this direction by the scientific workers mentioned above. The results of their studies are interesting and highly suggestive as far as they go and they seem to throw some light on the problems we are discussing with regard to the prune. Nothing, however, has been done in the matter of experimenting with the prune troubles under discussion up to the present time but it is the hope of the Experiment Station at Corvallis to undertake a careful study of these problems if funds can be found for such work. A project on the non-parasitic disorders of prunes has already been outlined and preliminary observations have been commenced by the Department of Botany and Plant Pathology of the Experiment Station. It must be borne in mind, however, that the study of non-parasitic diseases, especially in the case of tree fruits, requires a length of time and complicated equipment and facilities together with a fundamental knowledge on the part of the investigator selected to carry on the work not usually required for the study of the troubles of fungus origin.

At this point I wish to call attention to another condition in prune fruits which has often caused much loss and appears as a rule according to my observations later in the season than the other troubles mentioned. This is what I have sometimes called internal browning. It generally comes on about the ripening period and sometimes the grower is unaware of its existence until he examines some of the fruit preparatory to harvesting. The flesh next the pit or near the stem end is found to be dark colored as if attacked by a true rot. The discoloration may be slight or may be so extensive as to include the entire flesh but the trouble begins in the interior of the flesh and not at the skin in most of the specimens I have seen and for this reason cannot be confused with the true brown rot which begins with an infection in the skin and progresses inward. The internal browning is not due to any parasite but seems to be in some way connected with hot, dry weather late in the season. While conclusive evidence is not at hand I have a suspicion that a rainy spell following drouth may be the immediate cause, there being a possibility that the sudden supply of moisture to the fruit may rupture the tissues nearest the stem and the pit and cause the breaking down of the flesh in this way. I have had very little of this condition called to my attention this year from the Willamette Valley district but in some years it has caused much loss, not only there but also farther south.

In spite of the absence of scientific work on these non-parasitic troubles of prune fruit, I think we may feel certain that for the most part they are attributable either to excessive evaporation and insufficient moisture supply at the time the "peak" demand comes or to a sudden change from extremely dry to moist conditions of the soil and air. If this be true the only thing the grower can do is by every means within his power to promote in his orchard conservation of moisture and uniformity and steadiness of growth. The orchardist cannot control the rain and sunshine but he can promote a better physical condition of the soil for root development and root activity not only by wise and careful cultivation but by growing deep-rooted cover crops to perforate compacted soil and to add the nitrogen and humus which so many of our soils lack but without which maximum water-holding capacity of the soil and maximum fertility cannot be

obtained. Irrigation skillfully managed is the greatest resource many prune growers have but, with all but a few—a very rare few, it is an entirely undeveloped resource. I am going to predict a rapid increase in the irrigation of prune orchards in the state in the next few years and it will be a good thing, but irrigation must be understood intelligently if its application does not bring on other troubles. I take off my hat to the orchardist who makes the growing of prunes his business and does not leave it all to his helpless trees and nature, that is I take off my hat to him if he knows his business.

Since I could not tell you how to prevent absolutely and positively the troubles I was asked to discuss, I have tried to call your attention to the possible causes that by a better understanding of them you may be able through a study of your own individual orchards to put into practice methods which will help your trees to meet the critical periods more successfully than in the past.

Mr. Bailey: Professor Barss' paper is open for discussion now.

Mr. Barss: I would say that the fire blight was mentioned along with the rest, although the fire blight always appears before the scarcity of water.

Question: I would like to ask if this condition exists in the Willamette Valley?

Mr. Barss: I have seen the brown spot before. I don't think this variegated appearance has been called to my attention, at least not to any extent before this year, but I have seen the internal browning very bad. I think it was in 1916 there was a great loss from it, or what they called the brown rot. I thought it was a fungus trouble.

Question: Do you have reference to this browned portion?

Mr. Barss: This roughened surface?

Yes. I remember finding some prunes out in an orchard about ten or twelve years ago in this condition. I think that was a dry year, about ten years ago there was this same condition of the prunes coming up, and these prunes grew in among the apple trees, and the apple trees were thirty feet apart with the prune tree fillers. In that orchard were about 2000 apple trees and 800 or a 1000 prune trees and some peach fillers and pear fillers. This same condition came on the prune trees where the ground wasn't well drained, and I remember at that time sending a lot of these prunes to Corvallis to find out the trouble with them. I remember some of the prunes would be affected—half black, just like we had them this year, where they were further advanced than these prunes. I remember at that time the apple trees were growing very thrifty and were about twelve-year-old trees, and they had taken up the moisture, and I remember they were going to plow up the orchard. That was a dry year like this. I got a report from the college, and they didn't know what caused it, or anything about it.

Mr. Barss: I would be very much surprised if this sort of thing wouldn't come up. All of these troubles, of course, go with the prune industry. What I want to say is that it depends on the stage of the development of the fruit, and depends upon the peculiar combination of climatic conditions and the condition of the orchard and the

individual trees—you will get these different troubles non-parasitic in nature. I found a condition similar to this on some of my best grapes, that covered some of the best vines, and they were the worst where the foliage was heaviest and where the grapes were the most shaded. Now that was not due to sunburn. As a matter of fact, I think it was due to this heavy foliage. The heavy leaved vines evaporated more water than the vines that have less foliage and they drank out of the fruit enough moisture to cause this condition. When there isn't sufficient moisture in the ground, they take the moisture from the fruit itself, and it is the same with apples and pears and other fruits.

Mr. Cordley: I think it was in '96 or '97 that I myself was first able to study the brown rot. During the course of that study I found out that there were two forms of what we were calling brown rot; one of them as a germ or parasitic brown rot, and the other as this internal browning, and since that time we have come to associate it with—not only climatic conditions, but also with conditions in the individual orchards, and sometimes in a fairly good season you will find this internal browning under unfavorable soil conditions—that is, the plant being unable to get the moisture required from the poor soil.

Mr. Lewis: I notice this trouble especially in neglected orchards.

Mr. Barss: I suspect that when the moisture is being extracted from the fruit by the foliage and the soil sap in reaching the fruit becomes more concentrated, that the apples and other fruits would be more subject to disease.

Mr. Bailey: I would like to make an announcement at this time that anyone who wishes to can join the Oregon State Horticultural Society, and we would like to have all of you become members of the association.

We have with us this morning a man who is one of the prune pioneers of this county. He has made a pretty exhaustive study of prunes. Mr. Booth, I would like to hear you talk for five minutes. Can you tell us anything about the prices on the prune in Douglas county?

Mr. Booth: I can't give you any statistics. I can give you my experience and that of a few orchardists here, but not as a county or as a fruitgrowing section, if that is of any benefit. From bank records, going over a period commencing with the season of 1901, I have been much interested in the receipts of prunes, and within these years I have figured to my satisfaction that the average payment per acre in the Umpqua Valley, with good, bad and indifferent crops, was \$125 per acre. Now, it seems to me it should be more. The highest average included in this figure is \$630 per acre, which was produced four or five years ago. I do not recall the price per pound they received that year but this amount was received on six acres at Dillard. The highest price I have ever known them to be, with that exception, occurred this year, in another orchard of just six acres, and the net price of \$630 was produced on the fresh prunes. The highest price per acre in my own case was on eight acres that I bought on a sheep farm that I bought in connection with a well known lawyer of this town—bought it for a stock ranch, and it developed that there was fifty acres of prunes on it—a matter that we gave little considera-

tion, and after my partner had looked over the place, and after the winter came on he thought it would be well to decide what to do with the prunes, and we decided it would be a good idea to grub them up, but he wanted me to go out to the orchard and see it, so I went out to the orchard—it was at that time about seventeen or eighteen years old. I found a man who had worked there, and lived adjoining the land during that time, and he said it had never been plowed, and it looked it, judging from the mess that had congregated on it. It had not been plowed for some years—I don't recall how many. It had not been pruned for four years. It had had a little pruning, though, I could tell from the size of the limbs that had been cut off, and the stubs that were there. I said to Mr. Rice that I thought we had better put the land into alfalfa. At that time we had a county fruit inspector by the name of Mr. McC——. Providence has since removed him from our presence. He went out to look at the orchard and said what it needed was pruning. We had some little argument as to how it should be done, and he finally went to work. He worked two days for us, and then I came home. It looked like a graveyard—that is all. Mr. Rice stayed there a few days and he came home, and I asked him how he was getting along, and he said, "Well, he is getting a good deal of that stubble out there," he said, "it may be all right, but it looks like a graveyard. I think you had better go down and have another look at it," and I found it just as he said. So I got a fellow to prune there named Clough. At that time Clough had the finest orchard that I have ever seen. It has been somewhat neglected of recent years, but it certainly was a fine orchard then—about twenty-five years old—and he had a different way of pruning—he took some top out, so that there wasn't much left of the trees when he got through. About that time Mr. Rice tired of farm life and I bought out his interest. I was busy at the bank and didn't pay much attention to the place. I had a man there, and he came to me and said there was a good many prunes wasting on the ground. I know of one year there when you couldn't step on the ground without stepping on these prunes. They fell off mostly during July. So I went to the Agricultural College and described the situation to Governor Withycombe, and he asked about it, and I told him all I knew, and he said, "In my opinion, it would be more profitable for you to raise vetch for hay there than it would alfalfa. Next I went to Professor Peavy to talk to him about it, and we got into a discussion on timber conditions; then I dropped it, and later took up the subject with Professor Hetzel. In the meantime there was a young man commencing to come in there at the State Fair—I was quite impressed with him—he had a way of inviting me out to lunch and letting me pay for it—his name was Brown. I said, "What do you think about the constant disking of orchards, Brown?" Brown said he didn't know—Professor Lewis expounded on that. Finally Mr. Wilson came down to look at the farm, and I said, "What do you think of this, Mr. Wilson?" He said, "I will tell you what to do. If you will put ten acres in loganberries, I will take charge of it and supervise it, and we will share profits on it." In the meantime I saw Brown again, and Brown said he would take the matter up. I went to see Professor —— and he said, "I will tell you, Booth, sprouts will come up if you plow too deep, but maybe you won't plow deep enough." He said, "If I were you, I would plow it pretty deep in the center, and light towards the edges." I have pruned that orchard every three years, and the trees have had reasonable care, but during the time I was away at the State Fair they finally had so much trouble

with the driers that I built driers and then I had trouble getting men to run them—one man would sweat the prunes in the day time and another would burn them up at night—I had all these conditions to contend with, but I finally got busy on it myself, and I soon got to know which end to put the prunes in the drier and which end they came out. I went down into the orchard, after I took charge of it myself, so that I knew what was being done. I worked there years every day during the drying season, and was amply rewarded for the trouble. In this orchard there are fifty acres—twenty-five French and twenty-five Italian. They are heavily loaded. The orchard is not quite square. It is a little longer north and south than it is east and west, and the trees are set with the compass north and south. The French were very heavy on the end row, but the Italians were a light crop. On the second row of the Italians there were a few prunes, and on the second row of the French there was half a crop. That year Dr. Bailey became the fruit inspector. He spent three or four days there and gave me advice in regard to the orchard—said he thought I was pruning too heavy, and to do less pruning and more cultivation, and I hadn't been painting the wood where the limb was cut off. With that exception my orchard had had reasonable care for four years. I was always fond of horse racing, and was made a director of the National Trotting Association, and I had a chance to go East to a meeting of the association. I had never been East, and I thought that was a good chance to go. The day before I left I was offered $7\frac{1}{4}$ cents, orchard run, for my Italian prunes. I thought I ought to get $7\frac{1}{2}$ cents, and left instructions with the cashier of the bank to sell them at that price when the other customers of the bank sold—especially Mr. Wollenburg, who was a large grower, but prunes dropped, and Mr. Wollenburg sold on the basis of 6 cents, and when I came back there was no market at all, and I finally sold them to Mr. Gile of Salem. I sold him 130,000 pounds that year, Italian prunes at $4\frac{1}{2}$ cents delivered to the cars, and I got a cent and a half for the French, and I figured that I paid that year at least \$2700 for my trip East. That orchard has borne me eight crops, averaging along about \$125 an acre—just the average of the county, proving that I am just the average prune grower. I have always kept hogs in the orchard, and I plant vetch for fertilizer, and I have used all by barnyard manure. The place was a dairy farm at one time and there was a great accumulation of barnyard manure. I have cattle on the place as well as sheep—I favor the cattle more than the sheep. I turn the sheep into the orchard as much as I do the hogs. I rely on them to eat the mummies. I do this for the reason that they eat them better than the hogs—the hogs will pick up the prunes and leave the pit lying on the ground, and the sheep will eat the whole thing. I think that there is no better manure spreader than sheep, and I don't believe there is a better fertilizer for a prune orchard than their droppings. I have never used commercial fertilizer.

Mr. Worsley: Your committee on resolutions is ready to report.

Mr. Lewis: I want to say a word in regard to Mr. Booth's experience, especially in regard to sheep manure. I know of a man who came out to Washington and began buying up some orchards which were in rather a dilapidated condition, and he went on there and pruned up a bunch of the trees, and went to the stock yards and began buying cattle and sheep. He didn't grow any feed on the place at all—had to buy all the alfalfa he fed—that is about all he fed that

stock, but he would go and buy lambs and take them up there. He had small corrals, and he would bed them down, and the manure would accumulate, and he would spread this manure on the land, and the results he secured for the use of sheep manure are very interesting.

Mr. Paulus: Can't we have the resolutions first?

Resolution No. 1, My Mr. Paulus:

Whereas, At the last session of Oregon Legislature the biennial appropriation for the maintenance of the State Board of Horticulture was reduced to such an amount that the horticultural interests are jeopardized; Therefore be it

Resolved, That the Legislature of 1919 be requested to make an appropriation of not less than \$12,000 for the biennial support of the Horticultural Board of the State.

Moved and seconded that resolution be adopted. Carried.

Resolution No. 2, by Mr. Paulus:

Resolved, That the Legislative Committee of this society cause to be prepared and submitted to the coming session of the Legislature for enactment a suitable bill giving to those who labor upon orchards or furnish trees for orchard planting liens for their just claims, similar in principle to the mechanic's lien law of this state.

Motion for the adoption of the resolution carried.

Resolution No. 1, by Mr. Worsley:

Resolved that the Secretary of this association send a telegram of felicitation to our absent charter members, Mr. E. L. Smith of Hood River and H. B. Miller of Portland, who are in ill health and unable to attend this session of the society.

Motion for the adoption of the resolution carried.

Resolution No. 2, by Messrs. Park, Paulus and Worsley:

Appropriation for Horticultural Society.

Whereas, The fruit industry of the state of Oregon has now reached a total annual production of forty to fifty million dollars and fifty thousand people are now engaged in its culture and a hundred thousand more people find employment in it during various times during the year in the harvesting, evaporating, canning and packing industries dependent upon this industry; and,

Whereas, The fruit industry, although one of the largest industries in the state of Oregon, has not received and has not asked for but very small appropriations for its maintenance and furtherment; and,

Whereas, The Oregon State Horticultural Society is a fruitgrowers' society for the mutual dissemination of latest information and the mutual betterment of the fruit industry and was founded a third of a century ago and has been the stimulating agent for the fruit business of this state, and during the last legislature the appropriation for the maintenance of this association was voluntarily cut off and it now

finds itself in a condition where it must again have the state's support; and

Whereas, Its loss would be a great blow to the growth of the industry and the dissemination of knowledge and exchange of ideas of fruit growers; therefore, be it

Resolved, That we the members of the Oregon State Horticultural Society in annual meeting assembled, request the Legislature of the State of Oregon to set aside the sum of \$1000 for maintenance of this society for the years 1919 and 1920.

Motion for the adoption of the resolution carried.

Resolution No. 3:

Statistics.

Whereas, The fruit industry of the state of Oregon now embraces a business amounting to between \$40,000,000 and \$50,000,000 annually; and,

Whereas, There are now some 50,000 people in the state of Oregon engaged in the raising of fruit and it affords labor at various times during the year to 100,000 people; and,

Whereas, The fruit industry is rapidly growing and will become our major industry with the discontinuance of the hop industry, the cutting off of the timber, and the fast growing reduction of grain in the western half of the state; and, ;

Whereas, Overproductions have come upon the fruit business at various times during the past, due to lack of knowledge of what was coming into bearing, due to absolute lack of statistics as to acreage in bearing, coming into bearing, and being planted each year, and some branches of this it is apparent now will soon be in the same position again; and

Whereas, The state of Oregon is now being grossly underestimated as a fruit-raising state due to no fault but our own; and

Whereas, The work of collecting the acreage statistics can be done at practically no expense by the assessor's deputies, and will never be collected accurately by any one else; and,

Whereas, Foreign corporations operating over the state pack enormous quantities of fruit, a great part of which in making up the nation's statistics is credited to the states in which the head offices of these plants are located. Therefore, be it

Resolved, That we, the members of the Oregon State Horticultural Society in annual meeting assembled, hereby request the members of the Oregon Legislature to pass a bill which will make it compulsory for assessors of each county to list all of the acreage of fruits of various kinds, listing the name of grower, postoffice address, bearing acreage, and also listing the non-bearing acreage, showing amount of acreage of these non-bearing fruits in existence of each year's planting for five years back, and to also list the amount of fruit planted each year, these statistics to be listed on a form to be furnished by the Secretary of State, made up by him in co-operation with the Oregon State Board of Horticulture.

We also request that this law or another incorporate in it a clause making it compulsory for every canner, fruit packing house or fruit

shipper handling one or more cars of fruit yearly, either fresh, canned or evaporated, to report the quantity of his pack of each variety of fruit in terms of standard boxes or cases in canned or dried fruits, pounds or boxes in fresh fruit in accordance with the manner handled, a form for this information to be made up by the Secretary of State in co-operation with the State Board of Horticulture and mailed to every known firm operating in these lines in Oregon, but not relieving any one of the responsibility for furnishing this information on account of not having received a copy of these forms, and providing a suitable fine for failure to furnish this information within time necessary to compile the information in time for publication in the Oregon Blue Book, such date to be incorporated in and made part of the law.

Motion for the adoption of the resolution carried.

Resolution of thanks to the Commercial Club and people of Roseburg:

Resolved, That this society offers its sincere and high appreciation and thanks to the officers and members of the Commercial Club for the courtesy in extending to us the freedom of their hospitable Club Rooms for our meetings. To Mr. H. C. Bailey for his excellent manner in caring for our society during his presidency, and impartial and courteous ruling as our president; in relinquishing the chair to his successor, wish him continued success, prosperity and good health. To our efficient secretary, officers and particularly to those gentlemen who have so kindly contributed so valuable papers for the uplifting of our society and general prosperity of the fruit interests.

Motion put by Mr. Worsley. Carried

Mr. Minton: I move that the acts and reports of the committee be received, and the committee continued until it finishes its job.

**STATISTICS ON THE CROPS AND ACREAGE OF PRUNES IN POLK,
MARION AND YAMHILL COUNTIES, WITH SUGGESTIONS
FOR THE BALANCE OF THE STATE.**

Robert C. Paulus, General Manager Salem Fruit Union.

In the April 20, 1918, issue of the Oregon Voter there appeared a summary of the Federal Farm Survey's findings as to the acreage of fruits of various kinds in the various counties of the state. Being intimately connected with the fruit business I readily saw that the survey was not complete and the acreage listed did not do the fruit business, in Oregon, justice. I immediately began to evolve methods for taking a survey which would include every orchard, and one which would list both bearing and non-bearing fruits with the idea of getting a line on the future marketing problems which were sure to arise. One of the continual causes of grief in the fruit business is the continued lack of marketing preparations for anticipated over supplies of various fruits as they come into bearing. It is a short-sighted business policy to lay the foundations for a large business by heavy planting and then sit down and wait for them to come into bearing, not giving any thought to a market for the products of these plantings but trusting in a kind providence to have a ready disposition at remunerative prices for everything that can be raised.

The table of which I spoke, above, gives the total acreage of prunes in Douglas county as 1244 acres, Polk county 957 acres, Yamhill county 2428 acres, and Marion county 1012 acres. The error in these figures is readily apparent when it is known that the Salem Fruit Union pool at Salem is over twice the amount of acreage as is listed in Marion county and it is inconceivable that Yamhill county should have more prunes than Douglas and Marion county put together. A comparison of tonnage harvested in these counties readily disproves these figures.

As I personally have no time to get the details of the various acreages in the different counties it became necessary for me to secure the assistance of other parties to get this data. I immediately drew up a form for collecting the data and had enough printed for Marion county at our own expense. I endeavored to have the work done by the assessors' deputies, which is an admirable way of collecting these statistics, but I was too late in Marion county, but through the co-operation of Mrs. Winnie Braden, the secretary of the Dallas Commercial Club, we secured through the Polk county assessor a complete detailed survey of all fruits in Polk county, and I prevailed upon Mr. S. H. Van Trump, the fruit inspector for Marion county, to list the fruits there. I also was able, through the co-operation of Mr. H. E. Crowell, formerly fruit inspector at Newberg, to get a summary of the acreage of prunes there, and these summaries are the basis upon which this article is being written. During the summer I also sent copies of the census form to Mr. Stewart, fruit inspector for Lane county, and furnished Mr. Earl Percy, fruit inspector of Douglas county, with forms and he had started a survey when he was called to the "service."

In order to accurately gauge the amount of preparation necessary to take care of the on coming acreage it was necessary to list the young acreage and this was provided for on the census blank. The survey for Marion county is not yet quite complete, but many interesting things have shown up. We have always wondered how many

acres of loganberries we have in Marion county, and we have learned from the survey that the loganberry acreage in bearing is a little over 1400 acres. Walnuts, we were surprised to learn, amount to over 1000 acres, cherries 1500 acres, apples 2500 acres, peaches 400 acres, pears 350 acres, etc. Revelations in Polk and Yamhill counties are just as surprising.

The avrage of prunes as listed, though not quite complete, is as follows:

	Planted in	Marion	Polk	Yamhill	Totals
1 year old	1918	284	435	421	1,140
2 years old	1917	235	154	456	845
3 years old	1916	245	426	575	1,246
4 years old	1915	597	717	344	1,658
5 years old	1914	722	447	508	1,677
Estimated not listed.		700			700
6 years and older....		4,219	2,451	1,996	8,660
Totals ..		7,002	4,630	4,300	15,932
Less bearing		4,919	2,451	1,996	9,366
Non-bearing...		2,083	2,179	2,304	6,566

I have no accurate data for the other sections of the state, but I have secured what I think are reliable estimates from men in the fruit business based on a tonnage standpoint for the remaining dried prune producing counties as follows:

	Other Counties	Doug-las	Lane	Linn	Ben-ton	Wash-ington	Totals
Bearing ..	750	3,500	600	600	500	700	6,650
Non-bearing ...	1,000	3,000	1,500	600	800	700	7,600
Totals ...	1,750	6,500	2,100	1,200	1,300	1,400	14,250

These totals added to those given above for Marion, Polk and Yamhill county gives a total of 16,016 acres bearing and 14,166 acres non-bearing, or a total of approximately 30,182 acres in the state.

The crop of evaporated prunes, this year, was a bumper one and favorable weather during the harvesting season enabled the growers to save practically all of it. The tonnage for the state was in the neighborhood of 45,000,000 to 50,000,000 pounds of dried prunes. Clarke county, Washington's, acreage of prunes in bearing is about 3500 to 4000 acres and their crop added to the Oregon output made the total for the Northwest of between 55 million and 60 million pounds. On the basis of the past crop as practically a maximum output it would be safe to estimate 90 to 100 million pounds as a safe figure for a maximum crop for five years from now, provided the older orchards are fertilized and kept in a good bearing state.

The prune business in the Northwest will see an enormous development in the next five years. Just as many more evaporators as are at present in existence must be built. More packing houses must be constructed. And, if California growers put into effect the National advertising campaign now being prepared a great stimulus will be given to the market, but in order to hold their own Oregon growers will also soon have to begin advertising or California will get the business.

Thousands of acres of prunes will be planted in the Northwest. The only thing holding back an enormous planting the coming spring is the absolute cleanup of nursery stock. With 100,000 acres of prunes

in bearing in California and 50,000 acres non-bearing which will be producing crops five years from now, the prune business will be immense.

As to markets, I have no fear at present, for all the acreage now in bearing and planted. The whole thing will rest on the matter of distribution, preparations for which are now being made by the California Prune & Apricot Growers' Association, which controls 75 to 80 per cent of the California acreage.

It behooves the Oregon grower to begin to look into the future with the idea of providing for wider distribution. Nearly all of the former so-called overproductions of various kinds of fruit have been found later to be not overproduction but lack of market distribution.

Consumption of prunes in the United States before the war was about 1 pound per person. The advertising given the prune in millions of homes through its beneficial use by the Army and Navy where many million pounds went this year will stimulate to a great extent a demand after the war which did not exist previously, and it would not be much of a task with advertising to double the per capita consumption in the United States and with the resumption of the foreign shipping it will not be long until the customary 100 million pounds of export prunes will find their way into their old channels. The wonderful stimulation to the demand for raisins given the raisin business by the advertising of the Raisin Growers' Association augurs success for a similar campaign for the prune growers.

No discussion.

Before we proceed with the election of officers and the selection of a place for the next year's meeting of the Oregon Horticultural Society, we would like to hear from our old friend who has been with us for so many years and is a charter member of the organization, on "The History of Walnut Growing in Oregon," Col. Henry E. Dosch, of Hillsdale.

HISTORY AND DEVELOPMENT OF FRENCH WALNUTS IN OREGON

By Henry E. Dosch, Secretary State Board of Horticulture.

"The law of nature is that a certain quantity of work is necessary to produce a certain quantity of good of any kind whatever. If you want knowledge, you must toil for it, if food you must toil for it, and if pleasure you must toil for it."—Ruskin.

The history of the introduction of the English and French walnuts into Oregon would not be complete without tracing it to its origin on the Pacific Coast; I have spoken and written so much on this important subject that I feel it is not pleasant to repeat oneself, but in a paper like this which, in a measure at least, is to be a guide to many persons who desire to plant nut trees and who have no experience, it is absolutely necessary to repeat the fundamental principles in nut culture, so they can start right, and also a message of encouragement to those who have followed my advice and planted a walnut grove.

The walnut is a native of Persia and is supposed to have been introduced into Southern California by the Franciscan monks during the establishment of the California missions in 1769; records of its early history are scant, but mention is made of walnut trees growing about the missions by most writers of the "Records of the Founding of Missions" and the "History of Franciscan Missions in California"

and therefore it is safe to assume that with the advent of missions dates the introduction of this valuable tree. I have seen some of these ancient walnut trees, and while age began to tell on these gnarled giants and monuments of sentiment and homes left behind in sunny Spain, they still live and bear fine nuts.

These nuts were and are still known as the Los Angeles walnut, being rather soft shells and will only thrive in Ventura and neighboring counties in California. However, not many of this variety are now planted in California, but owing to the success Oregon had in growing the choice Franquettes and Mayettes and the higher prices paid for them in the Eastern markets, have planted large groves to Franquettes and Mayettes.

This brings us to the "History and Development of the French Walnuts Into Oregon."

When some 30 years ago I retired from business to regain my health, I bought the out-of-town place adjoining the city limits of Portland 500 feet above the sea level, on which we now live; the doctor's advice was to keep my mind engaged while my body would catch up. Being a lover of all nature, trees, bush and flowers, my mind drifted to the cultivation of walnut trees. Knowing little or nothing of the habits and growth of the English walnut, except the reminiscences of my boyhood days in Europe, I began to read up and to inquire of those whom I saw had large walnut trees growing, especially some on Sixth street in Portland, and some in Milwaukie, planted by Luelling, an early nurseryman, and some at other places, but was informed that Oregon was not a nut-growing country as some of these trees were more than 30 years old and had never borne any nuts. I concluded that there must be some good reason for this, as I could not convince myself that a country which grew every kind of fruit to such perfection as Oregon, having all the advantages in soil and climate that France and Germany have where the English walnut flourishes abundantly, could not grow that royal fruit, and soon learned that the variety planted here was the Los Angeles, described above, the most delicate walnut grown. After studying these trees, the following spring I found that the staminate or male blossom came abundantly some six weeks earlier, matured and dropped off before the pistillate or female blossom came in bloom, which after attaining the size of a pea dropped off for lack of pollination. I also found that some of the earlier German settlers had sent to their old homes for some nuts to plant, which thrived fairly well and bore some nuts, which proved to be the old English walnut, very hard shell and some even oily and rancid taste.

Feeling that there must be other varieties which were adaptable to Oregon, both as to softness of shell and palatableness of kernel, I wrote to Mr. Felix Gillette, of Nevada City, California, who made importation and growing of walnut trees a specialty. He sent me 5-year-old trees of second generation Propepartarines and Geratina varieties, which were duly planted with utmost care and every attention given afterwards but did not seem to do well; principal cause, unsuitable soil, for my ground is heavy clay underlaid with six feet of hardpan, resting on iron-granite foundation, absolutely unfitted for walnut culture. Nevertheless, I planted more trees of Franquette, Mayette, Cluster, Fertile and others, which did fairly well though very slow growth but being by-sectual and blooming late are, and have been, bearing very choice fruit. I also planted some hundreds of

nuts and sent the yearling trees all over Oregon, Washington, Idaho and even Montana to acquaintances to plant and have received most encouraging reports, some trees growing to 30 feet in height and bearing very fine nuts. It was simply a labor of love on my part, as I did it only for my own pleasure and for my fellow horticulturists and not as a business proposition, as I never had trees or nuts or land for sale, but I saw before my mind's vision the words of Carlyle when he said, "You can help your fellowman; you must help your fellowman; it is a duty, nay, even a divine privilege to lighten the burden of our fellow laborers by giving them the results of our best thoughts and experiences."

The first man who followed my advice and to whom honor is due for his close application to nut culture in all its varieties ever since, is Mr. A. A. Quarberg, of Vancouver, Washington, followed closely by Mr. Prince, of Dundee, Oregon, and Mr. Charles Ladd, of Carlton, Oregon, followed of course by those large plantations about McMinnville now under control and advice of Mr. Cooper, president of the Western Walnut Association, as well as Mr. Frank Dundee and Mr. Forbis, of Dilly, 1000 acres in Marion County, over 1000 acres in Polk County, and many other plantations throughout the state.

As I stated before, it is now over 30 years since I first experimented in nut culture, and it is not necessary to state here the many obstacles that had to be overcome and the many disappointments I met with, though practically all walnut trees planted since in Oregon, Washington, British Columbia, and even Montana, Wyoming, Idaho and Utah, many of which are now in full bearing, were planted at my earnest solicitation and those which were planted on proper soil and varieties adapted to our climate have proven revenue producers. This development, though slow, and the marketing of our superior product has been so pronounced that in the last few years I have again received many letters of inquiry by intending immigrants from many Eastern, Middle Western and even Southern States about walnut culture in Oregon, which of course were given careful attention and reply, and also letters from many others all over the Pacific Northwest writing what success they had with their walnuts and thanking me for the advice I had given them.

It should not be necessary and yet I deem it advisable to repeat that nut trees of all kinds do well on most soils except heavy stiff clay soils; it does best in moist, warm, sandy, rich loam, well underdrained with no hardpan, stiff clay or impenetrable soil nearer than 12 feet, as they are gross feeders.

After giving a thorough test to all known European varieties, the nuts of which I imported from France, as well as grafted trees of various varieties from California, I have reached the conclusion that for the Pacific Northwest the Franquette, Mayette, Chaberts, Parisienne and Columbia are best adapted to our soils, climate and market, giving preference in the order named. I consider the Franquette somewhat hardier, a regular bloomer and more prolific, while the Mayette or Grenoble, under which name this nut is known to the trade, is finer, though not so hardy, and the Chaberte and Parisienne are sought after by confectioners. We also have now some promising seedlings, like the Columbia, which may prove a happy addition.

For a number of years and even the present time there has been a considerable controversy about trees grown from the nuts or seedling

trees bearing smaller nuts and not so prolific as grafted trees. In order to satisfy my own mind again last year I examined some large groves of both seedling and grafted trees in bearing. Mr. Forbis, at Dilly, said that his grafted trees bear three times as many nuts as his seedlings, but recently he told me that this year his seedling trees bore full crops, while in Mr. Trunk's grove (50 acres) I find his seedling trees show more than double the nuts than his grafted trees of the same age and variety and on Mr. Prince's grove (100 acres) both seedlings and grafted trees bear alike both as to quality and size of nuts; and this year carry all the nuts they can possibly hold, some of which will yield 100 pounds.

On my own ground both seedlings and grafted trees bear lightly on account of the heavy clay soil and impenetrable hardpan. That practically leaves the question still open for further investigation though personally I lean to the belief that if the nuts to be planted for seedling trees are taken and selected from bearing acclimated grafted trees and planted in several varieties for cross pollination, good results will be obtained.

Our Northwestern-grown walnuts command a higher figure in the Eastern markets than the California product. Some years ago the output of Mr. Prince's walnut grove was sold to a wholesale grocer in New York who makes a specialty of supplying those retail grocers who handle only the finest and costliest brands. This merchant states that the walnuts from California do not come up to the requirements of his trade but the Oregon nuts do, as they are of the same varieties and similar in quality to the nuts he imports from France for his trade; in fact, they are better flavored and more nutty than the California product.

The importation of nuts into the United States has steadily increased from year to year. The government yearbook recently gives the following report of importation for the year:

"Shelled walnuts 11,107,490 pounds valued at \$2,322,754; unshelled walnuts 22,338,348 pounds valued at \$1,661,473. Total 33,445,838 pounds valued at \$3,984,227."

This shows an increase from the year 1902 of 12,362,567 pounds to 33,445,838 pounds for 1915 notwithstanding the disturbed condition of Europe. This is an enormous increase, both in importation and consumption. It might be casually observed also that of late years many walnuts have been imported from China and passed off by dishonest dealers on an unsuspecting public as Pacific Coast grown walnuts, many of which, both European and Chinese, have found their way into the Pacific Northwest.

Judging from reports which have come to me from all over the Northwest of the many plantations coming into bearing and the success growers have met with, it is most gratifying to me to learn, though the development was slow and tedious, we in Oregon have now reached the point of exporters instead of importers which will increase steadily as the hundreds of newer plantations come into bearing and that my efforts and experiments in introducing the French walnuts into the Pacific Northwest have not been in vain.

Kindly permit me to quote from a paper I wrote and read at our Horticultural Society meeting some 15 years ago:

"We of the Pacific Northwest should become exporters instead of importers; we have the soil and climate, hence my earnest advice still

is, as it has been for many years, to plant a few walnut trees. if you do not want a grove, and your children's children will bless you and thank you for your forethought.

"As a business proposition I know of no better in agricultural or horticultural pursuits, and once established a well cared for walnut grove is the best heritage a parent can leave to his family, as they become more valuable and more productive with age, always bearing in mind soil and variety."

The progress and development of walnut culture has proven that this assertion is even more true today than when it was written 15 years ago.

As long ago as 1893 I read a paper before the Horticultural Society in which I said: "The French walnut is to the orchard what the rose is to the flower garden and wherever you see a walnut tree in a door yard you may rest assured that warm hearts dwell within and you are equally assured a hearty welcome in a hospitable home."

Reviewing the whole situation as it presents itself today, we cannot help reaching the conclusion that walnut culture in the Pacific Northwest has not only reached a high plane of development, but is an assured success.

In closing permit me to express the hope that at no distant day every dooryard will have its walnut tree and walnut groves will be measured by miles along the public highways.

Appendix.

French walnut trees for a commercial grove should be planted not less than 50 feet apart; for fillers use prunes, filberts, loganberries and grapes for juice. Cut out when walnut trees need all the ground.

French walnut trees begin to bear at 5 years and in full bearing at 12 years, increasing as they grow older.

French walnut trees live to over 100 years, bearing nuts.

French walnut trees planted from seed as yearlings should have all branches removed every fall, allowing the center stem to grow seven feet and then allowed to branch out.

French walnuts should be gathered as soon as they fall, washed and dried in an evaporator under 80 to 100 degrees Fahrenheit to prevent moulding.

French walnut culls should be pressed into oil for culinary purposes; residue or pulp fed to cows.

French walnuts should never be bleached, it destroys their flavor, but should be washed before drying.

Varieties.

Franquette.—Blooms late in spring. Originated about the same time as the Mayette in the southeast of France by a man named Franquet. It is quite large, of an elongated oval and very attractive, the kernel is full fleshed and sweet and of rich nutty flavor. It also buds out late in spring; very desirable for a market nut.

Mayette.—This is one of the finest dessert and market nuts grown. It is quite large and uniformly so; well shaped with a light-

colored shell; the kernel is full fleshed, sweet and nutty. But what renders this valuable kind more valuable yet is that it is very hardy, being late in budding out, which enables it to escape uninjured the disastrous effect of late frosts in the spring; it is also an abundant bearer. This is the nut imported into the United States under the name of Grenoble. The Mayette was originated by a man of the name Mayet, 150 years ago, having ever since been a great favorite as a market nut.

Parisienne.—Large, excellent, starts late in the spring. This beautiful nut, also one of the finest for dessert and market, was originated in the southeast of France and not in the neighborhood of Paris as its name would imply. Its beauty made it Parisienne, in honor of the capital of France. The nut is large, broader at the small end than the Mayette and Franquette, and has a very pretty shape. It is as late and hardy as the Mayette.

Charbette.—An old and most valuable variety, late in budding out. The nut is well shaped, roundish-oval and of fair size, the kernel is of extra fine quality; good bearer. The Chaberte originated in France over a century ago, by a man named Chabert, hence its name.

Meylan.—A new and very attractive variety, originated near the little village of Meylan, in the walnut district of France. The nut is of fair size; very smooth, thin shelled and of excellent quality; buds out late.

Columbia.—Originated by Mr. Felix Gillett, of Nevada City, California; produced from a second generation Mayette. The nut is very large, exceedingly pretty, roundish with smooth light-colored shell and kernel of first quality; named Columbia in honor of the World's Fair in 1893, the year Mr. Gillett's second trees of that kind went into bearing.

Alpine or Wonder of the Alps.—A new and very rare variety, originated not very long ago in the Alps Mountains in France. Next to the Mammoth it is the largest walnut grown. Though the shell looks rough it is perfectly soft and thin, the meat sweet and filling well the shell.

The Gladys, Mammoth, Gnat and Bijou, all giant walnuts, some three times as large as the ordinary walnuts, good producers, and nutty, not desirable for market, except as a novelty or grown to be pressed into salad oil.

Walnuts intended for seedling trees, should be carefully selected as soon as they fall from the trees, then placed into shallow boxes, to-wit: Cover the bottom of the boxes with three inches of sand, set in the walnuts pointed end up, half inch apart, cover with four inches of sand and place the boxes in the basement, keeping the sand damp, not wet, and cover with wire netting to prevent rats or squirrels from stealing them. About March or April you will find all fertile nuts are sprouting; take up carefully and plant into nursery rows, or better still, where the trees are intended to grow, five or six inches deep.

The appellation "English Walnuts" is only a commercial term and are not grown any more as they are hard shelled and have a tendency to become oily and rancid. All those grown now are French walnuts or seedlings of French walnuts, semi-soft shells, meaty and toothsome,

For success remember variety, rich soil, clean cultivation and "no hardpan."

Mr. Worsley: There is no time specified in our program that I have found wherein an invitation might be extended to our association to meet during the year 1919. I desire at this time, on behalf of the people in the western part of this state.—I am speaking about the northwestern county of the state, Clatsop. I desire to extend to the Oregon Horticultural Society, the entire sentiment as expressed by the people of that county up there, an invitation for you to meet in the city of Astoria, Clatsop County, in the year 1919. To back up my invitation I have with me communications from the various organizations in our county. I have here a communication from Pacific Grange, No. 347.

Mr. Worsley, of Astoria, then obtained the floor and read the following invitations for the next annual meeting.

HALL OF PACIFIC GRANGE.

Carnahan, December 1, 1918.

Oregon State Horticultural Society,
Roseburg, Oregon.

The Oregon State Horticultural Society has been engaged in a noble work in this state and from its membership have emanated almost every law that has placed horticulture on that high plane of development which it now possesses. Clatsop county, in its climatic and soil conditions, is most favorably situated for every variety of berry growing and truck growing, and that a closer fellowship and mutual benefit may be derived and this portion of the state, never having been honored with a meeting of the State Horticultural Society, Pacific Grange No. 347 most respectfully invites the State Horticultural Society to meet in Clatsop County for its annual session in the year 1919.

Very truly yours,

FRANK HULBURT, Master.

Minnie Hymier, Secretary.

HALL OF WALLUSKI GRANGE NO. 566.

Walluski, Clatsop, Co., Oregon, December 2, 1918.

Oregon State Horticultural Society,
Roseburg, Oregon.

Believing that it will be for the mutual benefit of the Oregon State Horticultural Society and for the horticultural and truck gardening interests of the state and Clatsop County, Walluski Grange most respectfully invites the State Horticultural Society to hold their annual meeting for the year 1919 in the city of Astoria, with the promise of every social entertainment for which our city and county are noted.

Very truly yours,

JOHN T. RYAN, Master.

NATEL GRANGE HALL.

Lewis and Clark, Clatsop Co., December 2, 1918.

Oregon State Horticultural Society,
Roseburg, Oregon.

Natel Grange, by its unanimous membership, knowing that great mutual benefit will be derived by every member of the grange

in our county, and that the horticultural interests of the county will be stimulated, and that a large membership to the state society be secured that will be advantageous to all, most respectfully extend to the Horticultural Society this invitation, that the Oregon State Horticultural Society hold their annual meeting for the year 1919 in the city of Astoria, Clatsop County.

The keys of the city, the county and every Grange Hall in the county will be yours, for your social entertainment.

Very truly yours,

J. E. PHILLIPS, Act. Master.

ASTORIA CHAMBER OF COMMERCE.

At the Mouth of the Columbia River.

Astoria, Oregon, December 3 1918.

Oregon State Horticultural Society,

Roseburg, Oregon.

Gentlemen: This organization and the people of Astoria extend to your society a most cordial invitation to hold your next annual session in that city.

It is our understanding that your conventions during the past few years have all been held in the southern or eastern part of the state and we feel that this particular section of Oregon deserves favorable consideration when the time comes for you to decide on the place of your meeting in 1919.

Trusting that Astoria will have the pleasure of entertaining your delegation next season, we are,

Very truly yours,

ASTORIA CHAMBER OF COMMERCE.

By Frank H. Sanborn, President.

Ladies and gentlemen, this represents the sentiments of five or six hundred people living in the vicinity of Astoria and I want to extend to you on behalf of these people a cordial invitation to come to our city, accept our hospitality, and not only let the organization help us, but we think we can give something to you. We want to show you what Clatsop County has to offer in the way of climatic conditions and soil conditions. I am going to say to you that I believe we have today too many poor orchards and not enough small farms. We believe in small farms of from 10 to 30 acres in extent. We have a little creamery up there that provides butter for four or five towns. And I want to extend to you on behalf of our people an invitation to come up and stimulate us in these various industries—in what we are trying to do. Mr. Chairman, I would like to go home to Astoria, to these people who sent me down here with this invitation to this horticultural society to meet in Astoria, and I came here representing the Fruit Growers' Association, and I have an urgent invitation from the Astoria Chamber of Commerce. I have the documentary invitations at hand, but I want to tell you that if you come down to Astoria the town will be yours, and we will be glad to have you. Thank you.

Mr. Lewis: Mr. Chairman, we haven't had an opportunity to discuss Colonel Dosch's walnut paper yet. I don't see why this invitation business can't wait until another session. I want to say a few words in connection with Colonel Dosch's paper.

Mr. Bailey: This hour has already been reserved for the selection of a meeting place for next year and the election of officers. Are there any other towns or cities in the state of Oregon who would like to place an application for the next meeting of the State Horticultural Society?

Mr. Holt: Mr. Chairman, the fruit growers in the vicinity of Eugene and of Lane County have sent me down to this meeting and many have come with me to extend to this body an invitation to meet at the city of Eugene at your next annual meeting. I can assure you of a warm welcome and a fine attendance if you will honor us with your next meeting.

Mr. Park: Mr. President, I move that we accept the very kind invitation of Mr. Worsley to Astoria, before he has an opportunity to withdraw it.

Mr. Bailey: Are you ready for the question?

Thirteen for Astoria, 10 Eugene. Motion carried. Made unanimous on request of Mr. Holt.

Motion made by Mr. Minton that when the meeting adjourns it adjourn to meet in Portland on Monday, December 9, at the office of the secretary, 702 Spalding building. Motion seconded and carried.

Mr. Bailey: Nominations are open for recommendation for president of the Oregon Horticultural Society for next year.

Ben Worsley nominated.

Moved that the nominations be closed and the secretary instructed to cast the ballot in favor of Mr. Worsley. Seconded, carried.

Mr. Bailey: Nomination for recommendation for vice-president for the ensuing year.

Mr. Worsley: I nominate Mr. J. O. Holt, of Eugene.

Moved that the nominations be closed and the secretary instructed to cast the ballot in favor of Mr. Holt. Seconded, carried.

Mr. Park: I nominate for recommendation for secretary, C. D. Minton.

Moved that the nominations be closed and the president instructed to cast the ballot for Mr. Minton.

Mr. Bailey: I cast the unanimous ballot for Mr. Minton for secretary of the State Association.

Mr. Bailey: Senator McNary is the retiring director. We will have to recommend one in his place.

Mr. Minton: I want to again place in nomination Senator McNary as a trustee of this association. He has been a very valuable help to the horticultural interests of Oregon, and it comes with added weight to what he might ask of Congress in the interests of horticulture when he says that he is a trustee of the State Horticultural Society.

Nomination seconded.

Moved that the nominations be closed and that the secretary be instructed to cast the ballot for Senator McNary for trustee of this association. Carried.

Mr. Worsley: The resolution committee, appointed to draft resolutions, requests any suggestions to be in hands of committee by 10 o'clock tomorrow morning. There are many things this association ought to do. There are many things that want to be attended to for the improvement of horticultural interests of this state and I believe it is our duty while we are assembled here to give them our best thought and not leave things to the members of the Oregon legislature to take them up whenever they see fit, and then either neglect them or reject them absolutely. I believe such a body as these men here should receive recognition. They represent one of the largest interests in the state of Oregon. Fifty million dollars doesn't cover the output the association represents; consequently I believe we should have a right to be heard. If anyone has anything to suggest in the form of a resolution, give it to the committee tomorrow morning at 10 o'clock.

Mr. McDonald: I want to call the attention of the convention to the very good work of Colonel Dosch, who has done more for nut culture than anyone else in this state. When he began growing walnuts there were trees here then over 30 years old that had not borne any nuts, and I wish to point out the work that Colonel Dosch has done in that time in calling the attention of the people to the hardy French types of walnuts. He is very modest in placing before us today this little historical paper stating the work that he did, and I want to say that the work he did in calling the attention of the people of this state and in distributing these hardy French types is worth a fortune to a nurseryman. Colonel Dosch started an educational campaign on his own account, and through many years and in adverse conditions. People didn't believe that walnuts would grow—would bear—would be productive in this state. He persisted in his work until we brought to this country the Vrooman Franquette, which changed the whole phase and condition of walnut history in this country, and I want to just say this: That I think Colonel Dosch did an educational work for the walnut in this country, and especially on the Pacific Coast, that we will never be able to estimate.

Meeting adjourned until 8 P. M. to meet at the Umpqua Hotel.

The Horticultural Society met at 8:30 P. M. around the banquet board to enjoy the hospitality of the citizens of Roseburg and Douglas County.

H. F. Norton was toastmaster and after a delightful dinner served in most part from home-grown products, proceeded with the exercises of the evening.

A number of speakers were on the program, among them being Robert Paulus, of Salem; J. H. Booth, of Roseburg; Ben S. Worsley, of Astoria, and several others of local prominence.

A most enjoyable evening was spent by the members of the society.

SATURDAY, December 7

Meeting called to order by the president at 9:30.

Mr. Bailey: Mr. Minton tells me that the first thing the president will have to do this morning is to appoint an auditing committee. I would like to appoint as an auditing committee the same one we had last year, Albert Brownell, C. A. Burt and J. B. Pilkington. They will have to meet in Portland.

The legislative committee continues the same with the exception of Mr. Miller, and owing to his illness Mr. C. A. Parks will act in place of Mr. Miller, and we will continue the balance of the committee on legislation.

Mr. Minton: I have a matter that I want to bring before the meeting, and that is the matter of the Cardwell note. Mr. Cardwell has died and I think the note ought to be cancelled or written off the books, and I move you that we write off this note of Dr. Cardwell's. Seconded. Carried.

Mr. Bailey: As the next order of business, Professor Lewis has a matter he would like to bring before the society, and I will ask Professor Lewis to present it now.

Mr. Lewis: There is a good deal of agitation in the Pacific Northwest at the present time concerning the method of grading our apples and other fruit, and I was called to Spokane to attend a meeting of the fruit growers of the state of Washington to consider this matter. That meeting has been announced but has not yet been held. Their object is to have all over the United States uniform grades and grading. I probably will be a delegate to this meeting, and it would be well for us to get together on this and give the matter as much publicity as possible, and see that no grades are established which might not be to the best interests of all of us. The growers are proposing in a general way to reduce the apple packs from three grades to two grades, keeping the extra fancy about as it is now, and the fancy—combine the present "C" grades and the present fancy. The grades as proposed, however, are somewhat drastic. There are years when our Newtown matures without anywhere near meeting the proposed change. Now, it seems to me that we growers of Oregon ought to get together and get a representative of the government here to look over the situation as thoroughly as possible and thoroughly thresh this thing out. I might say in a general way that the total amount of fungus which would be allowed on a Yellow Newtown apple, for example, would have to come in a quarter of an inch. In order that this matter may be thoroughly discussed by our growers, I have prepared a resolution which I would like to offer to this society at this time, namely:

Be it Resolved, That it is the sense of the Oregon State Horticultural Society that a convention of apple growers, consisting of

delegates from the principal centers of production be called by the president of the State Board of Horticulture to meet with the representatives of the Office of Markets of the United States Department of Agriculture to consider questions pertaining to grading and grades of apples for the state of Oregon. Necessity for such a convention at the present time is due to considerable agitation on the subject and to the possibility that unless we are active at this time grades for the entire Northwest may be established which might be inimical to the best interests of the apple industry of Oregon.

I might say that we had built up in Europe generally, previous to the war, a splendid trade for the Yellow Newtown apple. Now that the war is over, we will want to resume that trade. In the past they have purchased all types and grades of the Newtown, while in Europe today they desire only what they will be willing to pay for. I consider this a pretty important question for us as a convention to consider.

Mr. Chairman, just to get this matter before the house, I move you that it be the sense of this meeting that such a meeting be called and that this resolution be adopted. Seconded.

Mr. Bailey: You have heard the motion. The question is open for discussion.

Mr. Brown: I would like to say a word on that motion; also in addition to what Professor Lewis has said. I have looked over carefully the proposed grades that will be brought up at this Spokane meeting and it seems to me that in some ways they are of interest at least in two respects—the question of fungus and the question of color have seemed to be the hall mark, and so they have rather lightly dealt with the proposed fancy grades, but when they bring the “C” grades up into the fancy they merely lower the fancy with respect to the hall mark and worm stings, etc., and at the same time absolutely increase the color requirements of the fancy grades.

That is one more thing that doesn't look right to us. In some of our orchards this year and last year, owing to the dry season some of our apples water-cored early and didn't keep properly because I believe they hung too long on the trees. I determined, therefore, that this year I would have apples that would keep, and I began by picking them with a little less color, so I picked them about two weeks earlier. We had very little rain to color up the fruit this fall and as a consequence we had some very light-colored apples, but our apples sold for \$1.50 a box without any trouble at all. You understand that in the proposed grades this third grade would have to go into the “C” grade, which includes unsound apples, apples that may not have been picked off the tree, or not picked properly, and which would not be of a good enough grade to ship out of the state under ordinary conditions, and I believe that sort of grading would be the ruination of our industry here.

Mr. Bailey: Has anyone anything to offer in the way of a resolution, or a motion?

Mr. Cooley: It seems to me that if we bring the poor or the “C's” into the fancy grade it is going to lower that and also tend to lower the extra fancy. The extra fancy will eventually have to go down the same as our fancy does, and if we know that we are establishing the grades for a uniform trade over the entire United States it

is pretty difficult to do. I don't think we ought to lower the grades. I would be glad to consider a better plan to keep the market if we could get a difference in our fruit—in our apples after they are marketed. We have got to put up a better grade, and we have got to put up better apples. They have got to market a fancy stock if they are going to ask a fancy price. There is no question in my mind about that.

Mr. Weatherspoon: It seems to me that it is a pretty well established fact that the grades that have been established in the Northwest have in a way been pretty well established throughout the United States—that is, the permanent grades. All the permanent grades have an excellent market, and the people as a rule understand something of the Northwest grades, and I favor the resolution—heartily favor the resolution, and further, I am a firm believer in the fact that it would be no improvement to our interests, as well as to the interests of the Pacific Northwest, to be changing these grades from time to time, as the buyers always look on these things with suspicion and take advantage of every way possible to make money for themselves out of these unnecessary changes. I am in favor of the resolution that was made.

Mr. Bailey: Are you ready for the question? Carried.

Mr. Cooley: Now, Mr. President, we have a box of apples packed by the Sykes system here for exhibition, and possibly this is a good opportunity to open it.

Mr. Bailey: We are trying to hold Mr. Barss till some of our local prune growers get here and we will ask Mr. Cooley to take his box of Sykes packed apples and pass it around. We will ask Mr. Cooley to explain the Sykes pack.

Mr. Cooley: Mr. Wood can tell all about it. Mr. Wood is manager of the Umpqua Valley Fruit Union.

Mr. Wood: If I know more about this than Mr. Cooley does, he doesn't know very much, because what I know about it doesn't amount to much. Mr. Sykes is the man who gave us this pack. He was here during the summer, in the early part of the apple season, and came rushing into our office with one of these boxes and in our presence packed a box of apples, and that is all I know about it. I saw him pack that box of apples yesterday and Mr. Cooley wanted to know if I would bring up one of these boxes—he was sure the members would be interested, so last evening I rushed around and packed this box of apples out of stock. I took the apples out of a regular box that they had packed there and simply transferred them to this pack. The boxes are nailed up the top and the bottom and one side and when you pack the apples you pack them from the side of the box. You simply lay this paper in on the bottom of the box and you place your apples in the right position, lay another layer of paper and another layer of apples, and so on until the box is full. The last layer in the box stands up about the height of one apple. Then you simply put it under your press and nail it down. When you open it you open it the other way. That is about all I can tell you about it, except his paper. You can open this up to show you what the paper looks like. They are thin cardboards. We slip one of these in and

then arrange it in the proper position in which to place the apples. Each size paper will pack three different sizes of apples. They are all marked with the proper markings in three different numbers of marks on each sheet, so that one of them as packed now will pack nine different sizes of apples, which practically takes care of all the different sizes of apples. This box contains 150 apples. I took these apples out of another box that was marked 150 and they packed just exactly as you see it here. The liner here we tore off. You would put the liner in in the usual way, and of course these filler strips of paper. Mr. Sykes said that he recommended no liner be used, for the reason that the box of apples will get more ventilation—more circulation and air by not having this liner in it, and that is the main objection to this pack. In giving the apple the pressure on top there is still a circulation of air all around the apple, except at the point of contact.

Question: Is there a patent on this process?

Mr. Wood: I understand there is.

Mr. Minton: I understood someone to say that these can be shipped tight—don't have to be space in the car. Is that right?

Mr. Wood: I don't believe it would be advisable to ship them that way. I never heard that claim, but he is making the claim that the apples will have a free circulation of air.

Question: What does the box weigh, Mr. Wood?

Mr. Wood: I have never weighed the box. I think, though, it is a little heavier than the other box. I suppose you could make it of lighter wood.

Mr. Lewis: I have watched this pack somewhat. I saw the man down here last summer and have some of the boxes up at the college, and I will say that I have been very favorably impressed in many ways with this pack. I have had occasion to look into the cheapness of it. It is claimed that it is much cheaper. As for the material, I know we can get the paper all right. There are two factors which stand out pretty strong in favor of this pack. In the first place, almost anyone can pack that box of apples. It doesn't take us very long to make that pack. We have taken them at the college—we ran the fruit through the grading machine and took it right out, and it takes just a minute to put in the paper and drop the apples in. Another important factor is the decided improvement in aeration. I understand that these boxes are being used in California, and if we can demonstrate that this pack is practicable for our use, it will solve to a certain extent a part of the labor problem, and if we didn't need the expert packers, it would probably cheapen the pack on that account, and in that way we could cheapen our labor bills, or perhaps do with less skilled labor and still get our fruit to market in an attractive condition. One of the possibilities of this pack here in the Pacific Northwest is the decided saving of time and work, and anything which will reduce that is worth a pretty close investigation.

Mr. Minton: How is that box handled in the car? Has anyone figured out what the cost of the box would be as against the other?

Mr. Bailey: I don't believe anyone has used this pack enough to know what the box would cost in quantities.

Mr. Wood: I think it will cost a little more, but I haven't the figures. The only quotation on the boxes we received was in lots of 25 from a company at Portland, and they charged us the same price that we pay for boxes now. I haven't the figures on the comparative cost of the box, but it would look as though it might cost a little more. There is a little more work on it and a little more lumber.

Mr. Weatherspoon: This box is something new to me, but it is just along the lines I have been speaking—these continual changes from year to year. That is only another swapping horses. It looks bad, you know, on the face of it, for a man to establish that kind of a business policy. You know the standard box is a $11\frac{1}{4} \times 21\frac{1}{2}$ box and it is made and sent all over this country, and it looks better for all the growers to use a uniform box all over the United States. The trade has got used to it and it is a question in my mind whether it is wise for us to make a change. I think it would be well for us to investigate it before urging it on to the wholesale packers and the associations. I happen to be very well pleased with the present boxes. It has been introduced and is known to individuals everywhere in the country. It seems to me we should be very careful about the introduction and establishment of new grades and different boxes. You have got to put the box up, and you have got to get a machine like they use for orange boxes. There is no criticism about the box.

Mr. Cooley: I am glad to hear criticisms. Everything new that comes to us, of course, has got to go through this same system and has to be criticised, but I believe as Professor Lewis says, that the trade will be ready to take up with this pack, and we should all be ready to take up something new that is good and that appeals to the market. Now take the matter of circulation claimed for this pack, the apples will absolutely dry up in that box without rotting with fungus or getting soft like they do in other boxes, and we know that as careful as we may be in putting in the pack in our other boxes, and in wrapping them absolutely tight from the air, or almost tight, so we may open a box in six weeks or two months, decayed apples, and if there is a soft or mushy one in the box it injures the balance of them. Now in this pack we will get our apples into market in better shape. As for the expense of the box, perhaps until we get in shape to make these boxes they may be a little more expensive, but it was more expensive to make the old boxes when we didn't have the proper machinery to make them with. It will take less lumber in this box, however, than it does in the old box, when you come down to figure the amount of inches of lumber that is in the old box. I believe if you gentlemen will study this pack and study the resources and advantages that are claimed for it, you would be willing to adopt it.

Mr. Lewis: I don't want to be misinterpreted in anything I have said. I think the subject warrants a very careful study and consideration. I have been impressed with this box, as I have stated. I don't know anything about the cost of this apple box or its relative cost as compared with the other box—your box men will make that clear, but the box can be packed in considerably less time than it takes to pack the old box, and it can be packed with less skilled labor. It is just a simple matter of changing the frame dimensions, and that

would be a small thing to do. I think we ought to look into it, and perhaps try it locally—give it a trial and see what the relative cost will be, including the handling and packing.

Mr. Brown: I would like to add one more word on the quality of that pack. We depend for tightness of our ordinary packs upon the bulge that it had. Now that apple box or that pack has no bulge at all that would give tightness to the pack. There isn't a space big enough so that the apples fit in and press each other and there, I think, is their strong point. Under the ordinary apple pack we have eight points of contact, and this pack has only two points of contact, and consequently there is less bruising of the apples than there is in an eight point contact. I saw one of these boxes packed down here and I took one of these boxes, or had it sent up to the college, and we got a few apples to demonstrate the method of packing. They told us it would never do, and when we got to the last layer that whole layer of apples was sticking out above the pack. They said, "You will knock that all to thunder when you come to put that lid down there." "All right," I said, but we got the lid on and the box was big enough for the apples, so we said we would take off the lid to see how they looked, and we took the lid off and examined the apples carefully and we couldn't see any bruises on those apples.

Now the wooden part of that box is all right, and so is the entire pack, and I don't condemn the box in any particular, but we have heard the matter of ventilation discussed here—lack of air on the sides. Now, lack of ventilation in these apples may be all right in the fresh state, but most—at least 70 per cent—of all the apples in the Pacific Northwest go into cold storage. Now cold storage is for the purpose of keeping the apples fresh until the retailers can dispose of them. There is no other system in the warmer climates of Louisiana, Mississippi and Texas, which consume a large part of the Pacific Northwest apples. All of these apples go into cold storage, and take these apples under this pack, without wrapping, and take them out of cold storage and expose them to the air six hours and you would not know that they were your apples. No apple under the sun except the wrapped apple will stand for these conditions. There is nothing remains in New Orleans three hours except in cold storage. If you were going to market further north, where you don't have to resort to cold storage, it might be all right, but when they go into cold storage and come out again in a temperature of 100 degrees when they had been kept in a temperature 20 degrees, your apples will go down very quickly.

THE DEHYDRATING PLANT AS A FACTOR TO AGRICULTURAL DEVELOPMENT.

Ray W. Gill, Field Manager of the Wittenburg & King Co., Portland.

The words, "Agricultural Development" cover a broad scope and one which, now that the war is over, must command full recognition from the whole Northwest if we are to really progress. Many factors will be included in this development such as better farming methods, cheaper money for our producers, better drainage and irrigation, better grades and inspection and also better markets. I will put the most stress on the latter and it is upon the phase of this better market that I will touch with reference to dehydrating plants.

Dehydration Defined—Fruit and vegetables drying in the ordinary kiln, tunnel and stack dryers is based on the principle of the rising of heated air creating sufficient circulation to remove the moisture. The temperatures used are very often high enough to partially cook the product and give it the dried taste with which we are all familiar.

Dehydrating removes the moisture at a temperature which does not break down the cell structure, but causes the moisture to come to the surface by capillary action where it is removed by large volumes of air the circulation of which is artificially created by fans. In this way the cells of the dehydrated products when placed in water will reabsorb the amount of moisture they originally contained and the product presents a fresh appearance and has the flavor of the fresh fruit or vegetable.

The old system of drying was very uneven and very often part of the product was underdried and part overdried. The theory of dehydration is to have an even distribution of heat and temperature so that all portions of the product are evenly dried. Processes have been so developed in dehydration that the products retain their original color after being dehydrated and refreshed. Their moisture content is so reduced in the dehydrated state that they will keep practically indefinitely.

The difference in the two methods is probably best illustrated by the difference with which clothes dry on a hot muggy day and on a cold windy day. Dehydrating plants pass from 25 to 50 feet of air a minute through their drying tunnels, which is probably 50 times the amount circulated by the ordinary system.

Given Impetus by War.—Certain processes of dehydration have been in use in Europe for several years, especially in Germany, and since the beginning of the war this industry has grown into an immense proposition. Holland especially has enjoyed a large business in dehydrated vegetables.

At the beginning of the war there were some half dozen plants in the United States who were pioneering the way in, what to this country, was a new enterprise. New food articles take slowly with the consumer and the way to commerce for these companies was beset with many difficulties; the process of introduction was slow and costly, but these encumbrances began to slip away when the United States and the Allies, at the request of General Pershing, began placing large war orders for dehydrated vegetables, calling mainly for potatoes and soup mixtures. This stamp of approval by the government will go a great way towards determining the merits of these products in the

eyes of the people, and when our boys come back they will scatter into every portion of the country with a first-hand knowledge that has come with the actual use of these dehydrated vegetables.

There has been no difficulty in finding a commercial outlet for dehydrated fruits since consumers have long been used to evaporated fruits, nevertheless these dehydrated fruits have not yet secured full and proper recognition, since people in general are too prone to confuse the old style evaporated article with the up-to-date dehydrated product which is far superior in value, being a cleaner, better-flavored and more-nutritious food.

War Has Taught Economy.—One of the big lessons of this war for the American population is the application of economy and it can be expected that there will be a disposition for more home cooking than formerly, and if this be true, the more costly precooked foods will find less demand. Good, clean, dehydrated food in cartons will do away with costly tins and expensive freight and has a big added advantage in that the housewife can "cook to taste." Nearly every family has some different way of cooking and seasoning and these dehydrated products offer the fullest opportunity for cooking the housewife's own way, and this feature is sure to win when once well considered.

These products can be procured in cartons at any grocery and offer the consumer a handy supply of vegetables, which are as good as the fresh article and are available at any season of the year. The product is also economical because the cook will need to use only the quantity necessary for the meal and the peeling and paring has already been done.

Many improvements in manufacturing are taking place and this, together with the fact that advertising costs will be less when these products are fully introduced, will lessen the cost considerably to the consumer. These modern dehydrating plants are built and operated with fullest consideration for cleanliness, nearly all the handling being done by machinery.

Development Obstacles Overcome.—In the many questions that have been discussed regarding the development of the Northwest, no one has contended that our climatic and soil conditions offered any handicap; in fact few, if any, sections of the country offer a better opportunity to produce such a comprehensive list of fruits and vegetables as it is possible to grow here, and yield quality and quantity both considered. The quality and finish of our fruits has won an enviable place in the markets of the world and our vegetables also are on a full par with our fruits in both quality and yield. However, both fruit and vegetables have suffered by reason of their great distance from markets and consequent high freight rates. In many cases this great distance has prevented shipment of perishable fruits and vegetables. The development problem of the Northwest is not and never has been so much a problem of production, but a big, definite and unsatisfied demand for more and better markets. Many of these markets would be available but for the high freight rates on long hauls.

Concentration of Space and Weight.—It is here that dehydration will enable the conservation of perishable crops by putting them into a form such as can be shipped to any of the markets of the world regardless of the distance, and by extracting the water from these fruits and vegetables much of the freight weight will be eliminated. There are features of dehydration which in a few years' time will tend

toward a greater development than is possible under other methods of canning and preserving. Among these are the highly-concentrated foods, both in space and weight, and will also reduce difficulties in securing cars. This concentration of weight and the fact that these products are put up in paper cartons, thereby reducing the cost of tin, will mean a great saving to the consumer. This saving of weight will also appeal strongly to the requirements of all ocean vessels and here the dehydrated articles are already meeting a rapidly-growing demand.

Shrinkage Table.—The following table will give the approximate shrinkage on several varieties and will show the savings in weight over green produce:

Apples	8 to 1	Onions	10 to 1
Prunes	3 to 1	Parsnips	8 to 1
Cherries	5 to 1	Potatoes	5 to 1
Strawberries	8 to 1	Pumpkin	13 to 1
Pears	8 to 1	Squash	9 to 1
Peaches	8 to 1	Rhubarb	20 to 1
Beets	9 to 1	Spinach	15 to 1
Beans	10 to 1	Tomatoes	15 to 1
Cabbage	12 to 1	Turnips	15 to 1
Carrots	10 to 1	Soup mixture	10 to 1
Celery	20 to 1		

In order to have a better understanding of the price at which these products are sold, the public needs to be acquainted with the amount of the shrinkage.

Supply and Demand.—There is an old saying that supply and demand control prices, but to this must also be added other features such as the problem of distribution, speculation and also the lack of keeping qualities of many products. The season for most fruits and vegetables is of short duration and it is here that dehydration becomes the means of making short season crops available the year around, thus greatly increasing the consumption and demand. It is here that dehydration and canners ought to enlist interest and encouragement from the growers who would be greatly benefitted from the increased market that is created. A special instance of this was seen by the company at Portland one year ago with regard to the celery crop. Favorable crop conditions on top of a large acreage, together with a lack of demand due to war economy, had created sure conditions for a celery slump and prices began to drop. Our company purchased several car lots of this surplus and the result was that the market held steady and little celery was wasted, the growers receiving reasonably good prices. Had it not been for these purchases, celery would have dropped to a very low figure and much of the crop would have spoiled in the field. This is only one instance where the farmer benefitted and many other cases could be cited concerning various crops. To those who have watched prices closely, it is apparent that it does not take much of a surplus to cause price depression. When there is an adequate supply, prices remain steady; but a surplus, no matter if small, causes depression and in the same way a shortage causes advance in prices, although in this case prices are more subject to the size of the shortage. Dehydration will become one of the greatest agencies ever known to reduce waste and when we realize that the crops in the Northwest

have always been subject to enormous waste, the importance of this feature will be better realized.

Support of Farmers and Business Men.—Factories, therefore, which are large users of fruit and vegetables should have support from the growers regardless whether price and demand are strong or weak and it will reflect largely how well they give this support what kind of a market develops for perishable green produce. Coincident with this business, support of the farmer should be the moral support from towns where such plants are located. Their presence will not only add greatly to the payroll of these cities, but they will also distribute much money among the business man's customers, who in all the smaller towns are largely the nearby farmer.

The Contract Breaker.—The time was some unscrupulous firms entered into contracts with the farmers simply to protect themselves against high prices, but treated these contracts as "merely scraps of paper," if the price fell below the contract basis, but this condition is now practically past and firms now value the good will of the grower as a big asset in their business and plan the game square. The bitter taste from some of these old experiences still lingers in the minds of many, making it difficult to write contracts. It is probably out of this past evil condition that there has emerged a tendency of some growers to use a contract simply to play safe with the disposal of their crop and, in case of high prices, ignoring it entirely or edging out from under their bargain with small technicalities. Stringent laws should be enacted giving fullest protection to both grower and manufacturer and these laws should be incorporated in the statutes so that it would not be merely a matter of civil court action. The possibility of these plants to increase their capacity and purchase will depend largely upon their ability to fill orders taken and the contract breaker is a serious menace and should be dealt with accordingly. The contract breaker injures the business opportunity of all honest growers.

By-product of Crop.—Many of the crops to be grown under contract with the farmer offer side features of great value to the grower, e. g., in securing a crop of carrots, sweet corn, beans or peas, the foliage and stalks offer an excellent food for livestock, either for feeding green or putting in the silos for winter use. The foliage of cabbage and cauliflower also offer valuable green feed for livestock and poultry after the crops have been harvested. The inferior grades of carrots, turnips and potatoes are excellent feed.

Crop Rotation Encouraged.—Many of the Oregon farmers fall very short of the yield capable of being secured and one main cause of this is lack of proper crop rotation. It has been fully demonstrated that a grain to clover and clover to vegetable rotation gives the best soil fertility. In the past potatoes and corn have been the main vegetable crops used, but now the large area of various vegetable crops used by dehydrated plants will make other crops available for rotation, which will permit drawing on other chemical elements of the soil than those used in growing potatoes and corn.

Large Yield Secured.—Our growers have made some fine showings with regard to yields, among which were 40 tons of carrots, 25 tons of cabbage, 30 tons of celery, six tons of string beans and 35 tons of rutabagas per acre. These yields, of course, are not the average but illustrate what can be done by the farmer by careful attention and fertilization.

Capacity and Production.—An idea of what can be developed in agricultural production by dehydrating plants will be seen by the fact that this company alone will process before the close of the season's run some 1500 tons of carrots, 600 tons cabbage, 5000 tons potatoes, 200 tons squash, 120 tons parsnips, 700 tons prunes, 400 tons onions, 150 tons celery, 400 tons loganberries, 100 tons string beans besides smaller quantities of other fruits and vegetables. These figures represent the green product.

Each of the two plants have a capacity of from 20 to 30 tons of green produce daily, depending somewhat upon the nature of the product to be processed.

Many Kinds Used.—The list of fruits and vegetables used for dehydrating is very comprehensive. Practically any kind can be processed and will take the place of the fresh article, but the following seem destined to be in the best demand when normal conditions have returned: Apples, prunes, loganberries, pears, peaches, string beans, squash, pumpkin and soup vegetables. Soup vegetables are usually sold in a blended mixture prepared according to the proper proportions. Carrots, onions, potatoes, cabbage, celery, parsnips, turnips and leeks are among the vegetables used.

Grades of Products Used.—There is an all too prevalent idea among farmers that any product too poor for market will do for canneries and dehydrating plants, where as a matter of fact quality counts with them just as much as on the green produce market, and only persistent education along this line will acquaint our growers with the necessity of producing quality, if the Northwest manufacturers of food are to reach for a quality market. At the beginning of its business the Wittenberg-King Company investigated those varieties that would give the best quality to the product, considering along with this the yield. After all, the quality of the product is a strong point in winning popularity with the public and it is the duty of all our food preparing manufacturers to study this important phase before making their contracts. In practically every case, varieties which have these good qualities will produce just as heavily as those of poor quality. The list of vegetable varieties used by our company has been somewhat revised since first started, but as now constituted is as follows:

- Potatoes, Snow Netted Gem.
- Rutabagas, Improved Purple Top Yellow.
- Turnips, Orange Jelly and Purple Top White Globe.
- Squash, Boston Marrow.
- Pumpkin, Winter Luxury.
- Beans, Burpees Stringless Green Pod.
- Sweet Corn, Golden Bantam
- Tomatoes, Selected Earliana.
- Beets, Early Model.
- Parsnips, Tender Heart Hollow Crown.
- Carrot, Chantenay.
- Spinach, Victoria, Thick Leaved.
- Peas, Early Morn Gradus.
- Cabbage, Orange Ball Head and Danish Round Head.
- Onions, Oregon Yellow Danvers, Australian Brown.
- Cauliflower, Dry Weather and Gilt Edge.
- Peppers, Chinese Giant.
- Celery, Golden Self Blanching.

In closing let me say regarding the future prospects of dehydration; it has been demonstrated beyond any question of doubt concerning the merits of the products and there remains only a clean cut business proposition of getting these merits before the public and the business will then become one of the biggest agricultural developing factors ever known, especially to those producing areas far removed from the centers of population.

Many educational problems will need to be worked out with the farmer, for the majority of these have been engaged in growing field crops and do not have a thorough knowledge of the culture of vegetables and fruits, especially the small fruits. Such knowledge will be necessary to these growers before they can successfully grow crops which will be profitable to themselves and at the same time be produced on a basis with which the manufacturer can compete with like industries more favorably located as regards labor and freight.

Growers are most liable to base their values on small sales to be made upon local markets and they must be brought to realize that it is not the exceptional price which will give him the most profits, but rather a large volume of business on an average price such as will be justified by all the contingencies to be met by the manufacturer. On the other hand, the manufacturer must not lose track of the fact that the grower must be well paid for his labor in order to keep him a satisfied and successful grower. A spirit of co-operation between the manufacturer and grower is the only sound basis for success of both and the interest of each is bound up in the mutual development of our agricultural resources.

Mr. Bailey: I am going to ask everybody who lives outside of Douglas County to stand up.

ORGANIZATION AND STANDARDIZATION OF GRADES

Hector McPherson, Chief of the Bureau of Markets, O. A. C.

General discussions of the marketing of fruits recognize five distinct classes or groups. (1) Orchard fruits, (2) Small Fruits, (3) Grapes, (4) Citrus fruits, (5) Non-citrus (tropical and sub-tropical) fruits. Of each of these there is a large number of varieties and each of the varieties is marketed in several different ways. So that while the problem of Oregon is practically confined to the first two of these groups, the problem is by no means so simple as would appear at first glance.

Orchard Fruits. Our main problem is, of course, the marketing of orchard fruits, which constitutes by far the most important group for the United States as a whole as well as for the state of Oregon. They include apples, pears, plums, prunes, peaches, cherries, apricots, quinces and nectarines, and others of less importance. The census figures for the combined total of orchard fruits produced in 1909 showed the enormous total of 214,600,000 bushels. A large proportion of this total is produced on general farms or farms specializing in something other than fruit, although in a number of states, including California, New York, Michigan, Pennsylvania, Missouri, Kentucky, Iowa, Ohio, Virginia, Tennessee, North Carolina, Illinois, Indiana, West Virginia, Colorado, Arkansas and Oregon we have considerable areas in com-

mercial orchards managed by men who make a special business of raising orchard fruits.

The most important and at the same time the most widely distributed of the orchard fruits is the apple crop. Apples are grown to some extent in most of the states of the Union. Nevertheless three distinct commercial apple belts are recognized; the old Eastern belt including New York, New England, Pennsylvania, Ohio, Indiana, Kentucky, Tennessee, Michigan, and the Virginias, the Middle Western belt including the Ozarks of Southern Missouri and Northern Arkansas, Southwestern Iowa, Eastern Nebraska and Kansas; and the Pacific belt including California, Oregon and Washington with Colorado, Idaho, Utah and Montana coming rapidly to the front as factors in producing the market crop.

Among the other important orchard fruits of these states are pears which are grown in California, Washington, New York, Michigan, New Jersey, Pennsylvania and Ohio. Plums and prunes are grown largely on the Pacific Coast in California, Oregon and Washington, although Idaho is coming to be a considerable factor on the Pacific Coast. Then we have our cherry crop in which the principal competition comes from California, Pennsylvania, Indiana, Michigan, Ohio, Nebraska, Missouri, Illinois, Iowa and Washington. Other orchard fruits are produced in some quantity but are commercially not of sufficient importance to constitute a special market problem.

The Importance and Function of Grading. No other factor in economic progress has been more important than that of standardization. It is true in all branches of industry and in all lines of commerce. Previous to 1800 practically all lines of manufacture bore the distinct individuality of the particular workman employed. Every implement had its distinct individuality. No two were alike. In manufacturing industry a great step in advance was made when Eli Whitney established his musket factory early in the 19th century at Pawtucket, R. I. Whitney was compelled to use inferior and unskilled workmen and the problem which he had to solve was that of accuracy in the construction in the parts of his musket. The inventive genius of the men who had previously perfected the cotton-gin saved the situation and set a new pace for our manufacturing industry. He perfected a set of devices by which hammers, locks, springs and screws were cut, pressed and milled into uniform sizes and shapes, so that any part of any musket was interchangeable with the same part on any other musket. Thus arose standardization and interchangeability of parts in our mechanical industry. Think of what this has meant to the world in securing efficiency and convenience in our devices for manufacturing, communication and transportation, household convenience and in many other lines. Could we live today without standard and interchangeable mechanism.

If we take those American industries which have resulted in the amassing of the greatest fortunes and which have achieved the widest reputation and inquire for the secret of their success, we find that it lies in the one word—standardization. Take Uneeda Biscuits, for example, you may travel from the Panama Canal to Alaska and you will find the same package, the same color, the same smell, the same crispness, the same taste. You may or you may not like Uneeda Biscuits but you have no trouble in making up your mind. If you don't like them this year you will not like them next year. If you don't like them in Oregon you will not like them in New York, they

are the same all the world around. In like manner we recognize Ivory soap, Heinz pickles and an endless list of other manufactured products whose names and brands have become household words. To a lesser extent but none the less surely the Sunkist brand of California citrus fruits is achieving a reputation for standard excellence comparable to these manufactured products.

In fact standardization is no less the keynote to progress in agriculture in general than it has been in the enormous development of industry and commerce within the past century. Even our great varieties of animals and plants are the results of careful selecting, grading, and standardization. An illustration or two makes this clear. Nature evolved the pig, but the pig the Lord made is a very different creature from the gluttonous loafer you have in your barnyard pen to tide you over the lean stretches of your horticultural experience. The original hog was a sinewy, long-legged, razor-backed, strong snouted, large-tusked, big-bristled, tough-hided animal. He was ready to challenge the best hunter's steed in a foot race and if brought to close quarters became an exceedingly formidable antagonist in the matter of self-defense. But ability in a foot race or in a contest for self-preservation were not the qualities men most desired in his hogs. He went to work on this natural basis, selected the particular characteristics he deemed useful. When he had gotten together a group of characteristics which suited his fancy he proceeded to standardize his breed so we have our Duroc Jersey, our Berkshire, our Chester White, etc. In like manner the process of standardization has marked the development of our sheep, and our cattle and our horses, and our dogs and our cats, our apples, pears, prunes, loganberries, etc.

Thus all along the line we find the path of progress marked by our dominant note the key to which is standardization. It is a universal law of progress. If the commercial horticulturist imagines that he marked the point where this universal law ceases to operate he will find sooner or later that he is badly mistaken. Just as Quaker Oats or any other widely known commercial product has attained its market place and reputation by standardization, so must our apple, our walnut, our dried prune, our loganberry juice and our hundred and one other horticultural products of Oregon take their place in the world in conformance with the universal law. The question then is, how to bring our products within the scope of this universal condition of success.

An examination of the process by which leading manufactured articles of commerce have made their nation-wide or world-wide reputations throws some light on this question. Most of them show large scale production and unified control over the whole process from the assembling of the raw materials to the inspection and shipping of the finished product. Back of the reputation of the Ford car, for example, lies a number of factors. First, we have large scale production under centralized control. Second, rigid inspection of every part and of the whole car. Third, a force of producers in which is developed loyalty to the organization and to the product of that organization. Every effort is made to build up an esprit de corps which permeates the entire organization from the day laborer to the local salesman. Fourth, a thoroughly organized system of advertising, making use of the most modern achievements in psychology and art. These principles will be found to a greater or lesser extent to be back of the success of most of the best known products of the commercial world.

Doubtless in the case of our orchard products some of the factors are difficult if not impossible of attainment. There can, for example, be no unified control of production. That is a matter which is up to the individual orchardist. Nevertheless, even here, amongst the best commercial orchardists certain effective practice, leading towards uniform results is coming more and more to dominate the industry. Manifestly, too, there can be no unified control or inspection of fruit for a country like the United States which had an average output of apples along of 213,650,000 bushels for the five years period 1912 to 1916, inclusive, where the crop is produced under all sorts of climatic and soil conditions covering almost all the states of the Union. Nevertheless it is becoming more and more apparent that some unified control of the packing and grading of orchard products is essential, especially in a section of the country like the Pacific Northwest where the cost of labor and transportation are so much higher than for many other producing districts. The question resolves itself into a consideration of the relative merits of (a) voluntary organization, (b) state inspection of all fruits shipped, and (c) a combination of voluntary organization and state supervision.

(a) Voluntary Organization. In demonstration of what can be accomplished by voluntary organization towards the standardization of horticultural products, California leads the United States and the entire world. The outstanding illustration of course is to be found in the citrus fruit industry, which is thoroughly organized through its Citrus Protective League and the Citrus Exchange. The first is organized for the protection of the industry, and looks after such questions as freight rates, icing charges, protective tariff, etc. The second has charge of the standardization and marketing of the product. It has had difficulties to overcome yet its success has been demonstrated beyond the shadow of a doubt. Through its efforts California citrus fruits have established a reputation which compares favorably with that of some of our best known manufactured products. In the same manner California walnuts and California raisins have made national reputations through strong, progressive organization.

Following the example of the citrus industry the prune and apricot growers to the number of about 5000 have organized themselves with a paid-up capital of approximately \$1,000,000 and handled about 110,000,000 pounds of prunes and 13,000,000 pounds of apricots out of a total product of 190,000,000 pounds of prunes and 20,000,000 pounds of apricots. Likewise the growers of cannery peaches have organized for the standardization and marketing of their product. The California Pear Growers' Association has been organized for the standardization and sale of its products. One of the most recent horticultural associations to be incorporated was the California Associated Olive Growers, consisting of 190 members representing about 1200 acres of the best olive groves in California. These are comparatively young organizations, yet they have already had a marked influence in standardizing the product and stabilizing the industry.

The method by which grades satisfactory to all parties concerned are being arrived at in California may be illustrated by the following letter from Harris Weinstock, State Market Director of California:

"This is answering yours of November 12th regarding standardization. For your information this is to say that so far as California is concerned, we have no standard methods of arriving at standardization. In some instances standards

have been voluntarily adopted by producers and by packers, and in certain other instances standards have been fixed by legislation. I am writing Horticultural Commissioner Hecke of California to transmit to you such standardization laws in connection with horticultural products as have been adopted in California, which may prove helpful to you.

"The method which I have followed in arriving at standards, through voluntary action, has been about as follows:

"For example, in the matter of olives we found that there were about as many standards as there were processors in the state. In order to arrive at a uniform standard, a conference was held in my office to which were invited representative growers, representative olive packers, representative olive dealers, experts from the University of California, and a representative of the Federal Pure Food Department. I found that at the beginning of the conference there were as many standards suggested as there were individuals present. However, after a full and free discussion of the problem from every angle, practically a unanimous decision was arrived at as to what should constitute standards, and so far as I know, these standards have been generally observed.

"Sincerely yours,

(signed) HARRIS WEINSTOCK,

State Market Director.

(b) Government Grades and Standards. Government control over grades of horticultural products has not yet reached a stage in which much can be learned from the results attained. The Federal Government has passed laws establishing grades of apples and controlling the dimensions of containers in interstate commerce. New York and a few other states have also passed laws establishing grades of apples. In the New York law provision is made in detail for the brand to be used in connection with the different varieties and grades and all closed packages of apples grown in New York state must be marked and branded in accordance with the law. A few other states have similar laws. A state system of grades has the advantage of putting it squarely up to the individual grower as well as organized groups of growers to comply with the law; while in the case of voluntary associations for establishing grades, the menace of the entire system lies in the unorganized grower who does not comply with the grade, and in the careless association which allows off-grades to slip in. On the other hand the complaint is made that state grades lack elasticity and are too rigid in years of scarcity and too lax in years when there is a bumper crop.

(c) A Combination of State Grades and Associations for Promoting Uniformity of Standard. In a state such as California where voluntary organization has been so successfully applied in the establishment of standard grades, it would appear that the laws for establishing grades emanate from the organizations which have already adopted the grades and tried them out in practice. The state thus comes in to give sanction to that which has already demonstrated its serviceability, and becomes an official inspector and arbiter of disputes.

It would appear from the difficulties that have already been experienced in the Pacific Northwest that some state action for the estab-

lishment of export standards would be of great benefit to the industry as a whole. Northwestern orchard products have already attained a wide reputation. The well earned reputation has resulted from the efforts of voluntary associations and private corporations in establishing standards and in carrying on campaigns of effective publicity. Our experience is amply sufficient to determine the limit of wise laws on standard grades. Such laws should be worked out for the three Pacific Northwestern States and enacted simultaneously if possible. They should give due consideration to variations within the variety of climatic and soil conditions in the different commercial orchard sections of the three states.

But even with a system of state standards and grades and state supervision of inspection, the effective organization of the different fruit industries of the state remains a matter of the greatest importance. In fact, without the support of live organizations the great essentials for success will be lacking. Organization presents the only means of effective advertising. Without organization, also, there can never be built up a spirit of loyalty to the industry. These are two essentials without which no industry and no institution today can lead more than a dragging mediocre existence.

Mr. Bailey: Are those resolutions ready, Mr. Worsley?

Mr. Worsley: I took the matter up with Mr. Parks, and he didn't think it necessary to take any further action in connection with a report.

Mr. Bailey: We have a little time for the discussion of Dr. McPherson's paper.

There are several men who have found it impossible to attend this meeting—one of them is Gordon G. Brown, who had a paper on Experiments with Nitrate of Soda as a Fertilizer in the Hood River Valley, and also LeRoy Childs has been unable to be here, and C. C. Cates, who was to have had a paper on pear blight, has been unable to be with us on account of the illness of Mrs. Cates. Charles A. Malboeuf, of Portland, was to have had a paper on Selling Apples for Cash, has been unable to be here, and the paper on Markets and Market Expansion, by A. H. Harris, who was unable to be here. We have all of these papers. Mr. Minton has them in his possession. Is it worth while to continue this session this afternoon, or shall we close the session at this time and let these people catch this afternoon train, and have these papers published in the annual reports. It is up to the meeting to decide—especially any visitors. I would like to get an expression of those present.

Mr. Worsley: Mr. President, as long as we have the papers, and they will be published in the annual report of the association, and every person who is a member of the association will get one of these reports, and I am in hopes that the association during the coming year will take the opportunity, through its officers, to try and have these papers published in the large daily papers of this state, at various times through the year, so that all the people in Oregon, whether they are members of this association or not, will become familiar with these topics that have been brought before the association at this session. There was a resolution adopted at the last session in Salem, and there was a committee appointed at that time to take up this matter

of publicity in bringing the actions and the works of our association before the people of the state. That may have been published—I never saw anything published in the various Oregon papers in relation to the action, except what was furnished by our secretary in our association pamphlet, but I believe that matter should be taken up and given publicity. There is going to be a great future in this work of ours, and I believe that if the matter is brought to the attention of the newspapers of our state, they will take up the publication of all these articles willingly, and I trust that in the future an arrangement can be made with the publishers of this state. I believe a committee was appointed last session that still holds, and I believe they should take up the matter. That committee was Mr. Dosch, the secretary of the State Board of Horticulture, and our own efficient secretary. I will do what I can during the coming year to interest the press of the state in our work. If there isn't any further business now, we can have a resolution introduced and adopted. It is possible for those of us who live in different parts of the state to get away on this one-twenty train, if there is no reason why we can't adjourn. If the members of Roseburg, or the members in Douglas county, desire to stay in the afternoon—that will be all right. I would be willing to stay until Monday morning, but there are some of the members who are anxious to get away, so if there is nothing else to come up, I don't see any reason why we can't adjourn at this time.

Motion made to print papers in the annual report and adjourn at the present time.

Mr. Minton: I would like to have a motion made to print the minutes.

Mr. Worsley: I move that the proceedings of this association be printed in an annual pamphlet. Motion carried.

Mr. Bailey: There was a motion to adjourn, but I heard no second to it.

Mr. Minton: I will second that motion now.

Mr. Bailey: It is moved and seconded that we stand adjourned to meet in Portland, Oregon, on December 9th, at the secretary's office.

Mr. Worsley: Before that motion is put, I would like to say a word. We are going down to Astoria in 1919. Now, the by-laws of our association prescribe the time when this association shall meet, as in November or December. It does not specify the dates, but does specify the month—either November or December of each year. Now, I want to say that I would like to have the association come down there to Astoria, if it is possible, some time either the last week in August or the first week in September—that is the time of the year when everybody in Oregon will be delighted to go to the coast, and it would give us great pleasure if the association would see fit to come during that time, or about that time of the year.

Mr. Bailey: The motion is that we stand adjourned to meet in Portland, December 9th, in the secretary's office. All in favor of the motion will signify by saying aye. Carried.

MARKETS AND MARKET EXPANSION.

By A. H. Harris, Publisher of Better Cooking, Portland, Oregon.

Temperamentally and by training and environment, the producer is not a salesman. The science of production is entirely different from the art of buying and selling. The producer needs information on soils, climate, cultural methods, and above all, industry and constructive thinking. The middleman needs information on transportation, crops, demands of trade, refrigeration, finance, and above all, he must have a nose for the needs of people as consumers.

From time immemorial the seller, whether for the time being he be producer or middleman, has been handicapped by not knowing what his competitor was offering or intending to offer for sale. The seller always has been handicapped by not knowing of all the markets within reach on the one hand and all the supplies in his line on the other. The wise middleman is the fellow who spends more time studying markets and supplies than he spends in worrying about paying the producer for the commodities he has bought and perhaps sold.

Middleman Is Necessary Under Present System.

The middleman is necessary in transactions involving the usual commercial practices, delays and risks. Under ideal conditions the producer and consumer might be brought together, but until human nature changes a good deal ideal conditions will not become common in this country. And until commercial practices are changed radically, the middleman in one form or another will remain in the fruit-selling game, whether we like it or not. In other words some sort of a marketing system must be maintained, and it is best for the producer at least that the most efficient system of selling be maintained with senseless competition and ignorance obviated as much as possible.

Production always takes place in the country, except in industrial lines, and marketing always takes place in the centers of population. For this reason it has been possible for marketing abuses to establish themselves and retain hold long after they have been discovered and exposed. Producers are busy with their productive efforts at home, and they have little time or inclination to try to fully understand problems centered hundreds or thousands of miles distant, and perhaps problems which have more or less of technical training involved in their intricacies.

Common Selling Abuses Killed Out in Producing Fields.

A most encouraging development of marketing methods in the Northwest has been going on for two or three years. and apple producers this year find themselves with excellent quality and high prices as well as strong demand, in their favor. Prune growers have profited by the war, and they, too, have been brought face to face with better marketing methods. The consignment plague has practically disappeared in the Northwest, and the federal government has gone a long way toward abolishing the unbearable abuses which for

a number of years made fruit growing unprofitable and in fact threatened the industry in the Northwest. Inspection, selling reports, publicity, each in its way, has had the effect of driving out of the marketing game crooks and shysters, and the growers have been given a more equitable division of the profits of their labors.

The federal government seems to have well fixed plans which will be worked out during the next few years, and the markets of the country will be cleared of the unconscionable practices of the past. A long step has already been taken in the system of inspection and marketing information, which has been spreading over the country since the war broke out. There is no reason why fruit—prunes, apples, pears, berries—should not be sold for cash and at fair prices, and the federal department of markets is making an effort to see that such will soon be the case where it has not already been accepted as the best practice.

Marketing Connections Broken Down by War.

While war-time conditions have brought about better times for the producer, the war abroad has broken down the marketing connections which had been established in England, France, Germany, and other European countries, and the task of rebuilding a marketing system will be one of the first problems which will face the Northwest fruit grower with the coming of real peace. Not alone must markets be developed in Europe, but South America must be taken care of, and above all, trade with the Orient must be established on a large scale. With the establishment of steamship lines to the Orient and the development of American trade in the Far East, the fruit growers of the Northwest should open an entirely new field for their products, and at prices which will pay a fair profit.

When the war began, England and Germany in particular were good buyers of Northwestern apples. During the season of 1914, England bought 1,036,054 boxes of apples, as against 1,788,236 barrels, in the United States and Canada. The Canadian shipments were small in the aggregate. Practically all the boxed apples were packed in Washington, Oregon and Idaho. With the coming of war this business was lost, as was the business with South America, it being impossible to get ships to carry the product to the waiting markets. Competition in the South American markets will be found in Australia and New Zealand, but the cropping season is different, and no seasonal competition will result even with heavy shipments of apples, prunes and other commodities to the southern hemisphere.

China Greatest Field for Market Expansion.

The greatest field for market expansion, so far as Northwest fruit goes, lies in China. Japan, Siberia and the Philippines offer fertile territory, and practical marketing methods should be introduced in each country, but in China the field is so wide, the population so great, the consumption of high-grade fruit so limited, that for a score of years marketing development work would find virgin fields.

China is little understood by English-speaking races, at best. China is a nation of fixed business as well as social customs, of little change, of a peculiar cunning in commerce and trade. Failure of other nations to comprehend these facts has prevented the development of business in a number of lines, including the marketing of

fruit. Americans will be a long time changing customs and practices in China, but it should be a simple thing to adapt American trade practices to the demands of a people as solidly fixed in every detail of buying and selling as are the Chinese. The only foreigners who have developed great trades in the Orient have been those men who at once adapted their business methods to the centuries-old practices of the oriental counting house.

Perhaps I may be able to clear up a few of the popular misconceptions of China and the Chinese.

China a Land of Wealthy Business Classes.

In the first place China has a little more land area than half the area of the United States with four times its population. This fact has brought the people very close to the soil, and in China we find the best farmers and the best cultural methods in all the world. For 4000 years the soil of China has been tilled, and methods have been improved until it is thought maximum production has been reached. It is not lack of production that has stalled China on the road of progress, but the lack of transportation. China can produce abundantly among her own people, but she cannot distribute, except by the most crude methods of transportation. Her ports accommodate the great ships of the world, and by them she can land commodities in London—under normal conditions—quicker and cheaper than she can serve her own people living inland a few miles.

China is not a country of coolie labor exclusively, as many Americans seem to think. China has millionaires, thousands of them. China's isolation among the nations of the world has made it possible for cunning men to grab and to hold, just as prodigal Nature has made it possible for far-seeing or selfish Americans to gather the natural resources and make themselves millionaires. It is among this wealthy class of Chinese that a market will be found for Northwest apples. The poorer classes use and will continue to use native fruit—if they consume any at all—and native fruit is both cheap and of extremely poor quality. This fact is of first importance in considering our subject.

Chinese Apples Come from Siberian Crabapple.

The Siberian crabapple tree grows wild all over Northwestern Asia. This tree has become the foundation for all the apple trees in China, and the quality of the native fruit is fixed by the parent stock. All sorts of varieties of apple scions are grafted on Siberian crab stock, and all sorts of small and hard and tasteless apples result. With this poor quality of fruit the poor native must be content but the better classes, the wealthy classes, the trading classes, demand fruit imported from Japan or the American continent. At the present time Japan is the strongest nation in Chinese fruit markets, with the United States second, Canada third, and Australia fourth. Australian apples reach China during the months of March, April and May, only, hence they do not compete with American fruit offered in fresh state.

An interesting fact must not be overlooked. Chinese merchants never—never—import apples. Native merchants will buy and sell fruits, but they demand that such perishable products be delivered to them before they will buy. Chinese are cunning as well as close buyers, and they lose none of their skill in transactions which involve

American fruits. Even with almost hopeless handicaps, seemingly, Northwestern apples have been going to China since 1892, and with increasing demand. The figures for imports into Shanghai, China, are interesting.

Importation of Apples Shows Steady Increase.

In 1892, 8959 boxes were received. Ten years later the number had grown to 20,061. In 1912 the demand had decreased or the supply had run short for only 11,904 boxes were received, as against the high mark, 24,783 boxes during the year 1909. Last year, with the war raging in Europe and shipping in a stranglehold, 16,566 boxes of Northwestern apples found their way to China. These apples were received at Shanghai, where the 1917 supply sold as high as \$6 per box, in Mexican money. Ocean freight on apples to the Orient has ranged between 30 cents and 90 cents per box, the latter rate being fixed after the war work had taken over most of the Pacific Coast shipping.

In developing the apple field in China, Canadian dealers have led the way, largely because a large percentage of foreigners in China are of English blood, and show a preference for fruit shipped from as near the old home as possible. Then the Canadians have been wiser than Americans in choosing varieties and in packing for the foreign market. There is no refrigeration on shipboard between the Pacific Coast and the Orient, and apples must be packed specially for the long journey. It is an unfortunate fact that Canadian apples sell for much more money on the markets of Hong Kong or Shanghai than fruit from the United States. The Canadian varieties sent abroad are of the best, while the early exporters from this country sent Ben Davis and other varieties which stand well below the top as to quality and flavor but which hold up well under the long sea voyage and can be sold out of season without being held in cold storage.

Chinese Prefer Apples of Smaller Commercial Sizes.

The Chinese is not partial to large apples, in fact he prefers the smaller sizes of American stock. A pack of approximately 150 apples pleases the average consumer, but the stock should be of the best varieties. It has proved a mistake to send second or third-class fruit to the Orient, and a lot of good trade has been lost to the Northwest through the practice.

Not all the problems involved in selling Northwestern fruit are to be found in foreign market expansion plans. At home, the apple and the prune do not find as many enthusiastic supporters as either should. While sales methods have been improved, so far as the producer is concerned, in the retail trade crude methods still exist and the effective advertising done annually is confined to a small part of the active trade. From one end of the Northwest to the other apple window displays this year—as usual—have been inferior, and in many cases the grades offered consumers have been irregular. In other words the local market is being neglected or “queered,” as the case might be. So far as I know, there is little constructive planning for the development of future trade through increased consumption of Northwest fruits.

Men of European Origin Gaining Control of Markets.

In the Eastern centers as well as in Portland, Seattle, San Francisco, and other cities, the grocery and supply business is passing into the hands of men of foreign birth, a trend which means more or less hard luck to the producer of fruit. Greeks, Turks, Hebrews and Italians are close buyers and cunning sellers, and their control of the fresh-fruit business in this country must necessarily mean a breaking down of grades and prices. Following the war, this condition does not appear attractive to me, yet it may not be as far-reaching in its effects as at first would appear.

The entrance of a large foreign population into the fresh-fruit marketing game adds importance to the off-grade stock and undesirable sizes. With market conditions regulated from the bottom up instead of from the top down, prices are likely to be depressed, and grades lowered, either consciously or unconsciously. With grades broken down the Northwestern apple will have trouble, as it will be driven into close competition with barrel stock in Eastern centers. Strict regulation of grades, perhaps by the federal government, might prove an effective way of keeping conditions from becoming worse in this respect.

Change in Diet Caused by War Is Important Factor.

Fruit producers and fruit dealers should take advantage of the ground gained through the effect of the war on the diet of the peoples of the world. Not alone did the American people learn that fruit and vegetables should occupy a more important place in the diet, but everywhere valuable lessons of conservation and thrift were learned. The values of food commodities have been studied as never before. The good work should be kept up, not alone for the financial consideration, but also from the angle of better health and the development of the diversified resources of the country, particularly the Northwestern states.

To bring about increased consumption of fruits is one of the chief problems before the producers of the Northwest. To send apples to the four corners of the earth would be the height of ambition. To give apples and other Northwest fruits a permanent place of importance in the diet of our own people, and to thus place horticulture on a new and higher plane, would be an achievement worth while for every man and woman who claims Oregon, Washington or Idaho as home.

HORTICULTURE IN MARION COUNTY.

By S. H. Van Trump.

Marion County, like ancient Rome, is built on seven hills—seven hills with seven sunny valleys lying between. On the hills thrive and flourish the prune, pear, cherry, loganberry, the walnut and the filbert. In the valleys the peach and the prune, the apple, walnut, and all the garden and field crops of the temperate zone are at home, and yield to the delight of the most fastidious.

The Prune.—Marion County has about 7000 acres in prunes of ages varying from 1 to 25 years. Perhaps 60 per cent of this acreage or more than 4000 acres of these trees are now of bearing age. The crop of 1918 will exceed 12,000,000 pounds of dried prunes, in addition to the 1,200,000 pounds which were shipped green. The crop of the past year, therefore, had a cash value considerably above \$1,250,000. Of the total acreage of prunes in Marion County at least 75 per cent are planted in the hill lands, the other 25 per cent being in the sandy bottoms and clay loams of the lowlands. Many of the old orchards, especially those of the hills, are beginning to show the need of a more scientific regime of pruning, fertilizing and cultivation. And if these old orchards are to continue to produce paying crops some improved system must be adopted by their management. In the past barnyard manure and vetch as a cover crop have been the chief source from which growers have drawn their supplies of nitrogen and organic matter. Now barnyard manure is to be had only in very limited quantities, and there is a noticeable tendency among orchardists to abandon vetch. The present tendency is to depend entirely on nitrate of soda as a complete fertilizer for the prune orchard. This is a serious error in judgment that will lead to loss, and deterioration of the soil. The chief parasitic enemies of the prune tree and its fruit are the root borer and the brown rot. For the latter enemy we have a reliable remedy in sprays that are not as faithfully applied as they should be; for the root borer we have no wash that has proved entirely dependable, and growers are compelled to go over their trees twice each year to save them from this pest. Besides the great expense in time there is always great damage to the tree at best.

The Pear.—There are about 350 acres of pears in Marion County. Most of these trees are of bearing age. This acreage is about equally divided between the hills and the lowlands. Seventy-five per cent of all pears grown here are Bartletts, and practically the entire crop of Bartletts is sold to the canneries. There is no noticeable tendency to increase the acreage of pears in this county. The two worst enemies of the pear, scab and blight, were not serious during the past season. Scab is now practically controlled by two or three sprays of lime-sulphur beginning with the "pink spray." Fire blight exists in Marion County, in numerous centers of infection, where it is found mostly on wild species. These centers are carefully inspected each summer and the disease cut out.

The Cherry.—Marion County has some 1500 acres in cherries, 75 per cent growing in the red hills and 25 per cent in the lowlands. Royal Anne is the chief variety grown, followed by Lambert and Bing.

Owing to the severity of gummosis in the past, and the scare growers got from the chorry fly in 1917 there is no tendency to increase the cherry acreage at this time. The greatest diversity of opinion exists among growers as to the kind of soil most suitable for the cherry, the best treatment for gummosis, the proper methods in pruning, cultivations, etc.

The Peach.—In Marion County there are 400 acres in bearing peach trees. These orchards are located almost entirely on the sandy river-bottom soils. The varieties mostly are Crawfords, Charlotte and other yellow-fleshed freestone varieties. Almost the entire production of Marion County peach orchards are sold in the local markets and directly in the orchards for home consumption. In recent years when crops were good more peaches were grown than could be sold in these local markets and we have had over-production and the digging out of some orchards. The worst enemy the peach tree has here is the California blight and nothing short of eternal vigilance in spraying will keep it from destroying our orchards.

The Apple.—Ten or 12 years ago Marion County went rather extensively into the apple business. One orchard of 500 acres was planted and several of 125 to 150 acres. The total acreage in this county at present, exclusive of family orchards, is about 2500 acres. This acreage is about equally divided between the hills and the lowlands. The varieties mostly planted are Spitz, Roue, Yellow Newton, Gano, Grimes Golden and Jonathan. These large apple orchards up to the present time have not paid interest on the investment, and there is a tendency to dig out and plant in other crops.

The English Walnut.—Commercial orchards of English walnuts cover more than 1000 acres in Marion County. The first small plantings of English walnuts were made in this county about 40 years ago. A few of these seedlings proved good varieties well adapted to our soil and climate and have produced large and profitable crops of nuts for years past; but most of them were worthless, blooming too early, inferior in size, poor in quality and otherwise undesirable. Of the 1000 acres of walnuts now growing in Marion County, at least 50 per cent of the orchards show small prospect in their present state of ever becoming paying propositions. About one-half of these failures are the result of planting orchards on soils and in situations where a walnut tree should never have been planted; the other 50 per cent of failures are due to planting worthless seedlings. There is an easy way to redeem and render profitable these fruitless seedlings where growing on suitable soil by grafting them over to varieties of proved merit in that locality.

The Loganberry.—Of all the small fruits the loganberry is of transcendent importance and value in Marion County. This county now has more than 1400 acres in loganberries and the acreage is rapidly on the increase. The best soils for the loganberry are the deep sandy river bottoms, the bench clay loams and the deep fertile soils of the red hills. The loganberry, like all fruits, requires good drainage and will not thrive on the flat lands unless those soils are given good artificial drainage, and this in many localities is difficult to secure. The essential points to success in loganberry culture are: First, a suitable soil; second, thorough and proper preparation of the soil; third, proper methods in planting and trellising; fourth, proper culture, including fertilization and spraying; fifth, good business

methods in harvesting and marketing the crop. The yield of loganberries in this county during the past two years of severe drouth has been small. The yield of 1918 ranged all the way from one to five tons per acre. By proper selection of soil and wise methods in all the details of cultivation and fertilization, the average yield for the county ought to be brought up to four tons per acre. The loganberry at present has no serious fungus or insect enemies. In some sections in past years anthracnose has shown up as a serious infection and it may be that this disease is on the increase in virulence and in future it will be necessary to combat it with the Bordeaux spray applied in spring and summer.

SELLING APPLES FOR CASH.

By Charles A. Malboeuf.

One of the main features in apple marketing the past season was the coming of the cash buyer. For the first time in years his influence was definitely felt all over the Northwest. A lot of districts not previously acquainted with this element of the trade were brought face to face with him. His presence backed by ready money resulted in more apple tonnage changing hands for cash at shipping point than was ever before the case.

Question naturally arises as to the cause and effect of this rather unexpected but welcome-to-the-grower situation. The elementary cause we can readily conceive was the abnormally short Jonathan crop, which fell down materially in all sections. But why with a large national apple crop, purchases on the cash basis should have extended into other varieties, is rather difficult to analyze offhand. It does not matter very much, because the cash buyer came and left, and yet as a mere incident of the season it is interesting that according to the latest government reports, the national apple crop was about 10 per cent greater than last year's. That the Northwest crop was around 30 per cent shorter than that of 1917, cuts some, but not the whole figure, since the Eastern crop was greatly in excess of last season and invariably it is the tonnage of the barrel apple sections that influences the movement of the boxed product. Hence why this new condition, unheard of along the same lines of magnitude in the past?

No doubt the high prevailing prices for food stuffs of all kinds, as well as the principal living and clothing necessities, had something, and likely, considerable to do with the cash demand for apples, especially with the unusually high prices paid for them. Psychology, too, probably had a close hand in the situation, and if that be the case it would seem entitled to a place in our discussion dealing with so much cash selling by the growers. Psychology, however, very infrequently means the formal kicking overboard of long established practices, whether in fruit trading or in any other line. It seldom creates novel precedents over night, though it may open new avenues of thought, but its best known characteristics is that it commonly reflects sudden circumstances and intuitive action. It is more noted for its ability to produce spontaneous exhilliration or sharp jolting than it is to inaugurate a new era of things.

Whatever the reasons that actuated the cash buyer to be so flush and profuse in our producing districts—speculation already exists in

the minds of growers whether selling for cash, having gained such an impetus this season, is to be from now on a permanent feature in apple marketing. All through the producing districts, large or small, many growers are looking on the event as the natural answer to their long standing invitations to the cash buyer, who also has been long regarded as a final solution of their marketing problems. Most growers hope this is the case. Others more sanguine actually believe it is. Others are uncertain, and still others are not a little apprehensive that what did happen was the effect of psychology, that it was victory year psychology which prevailed, and that the same order of things, that is to say, such natural exuberation over national glory, is not likely to be repeated—at least very often. One thing is certain, there will be fewer Kaisers to get rid of in the future.

The 1918 fruit season as a whole was a very unusual one. To a certain extent at least it was artificial and in other degrees a psychological one. All commodities were sky high in selling values. Peaches and all small and other deciduous fruits brought record figures. There is scarcely an article of fresh fruit that did not average higher prices than the nation has seen for years. No perceptible shortage of fruit existed. But there was abnormal demand for it because the nation was at once at its zenith of financial and mental prosperity. This frame of public mind was based on something, and it might be that that something was the definite turn of the tide in military operations in Europe. That the public had more money to spend than under normal times cannot be overlooked, but whether living expenses would have been as freely met had defeats instead of victories marked the summer's campaign, is to be seriously questioned. Victory loosens the purse strings as surely as disaster tightens them. Disaster in turn never fails to affect the market. The cash buyer then, in his generous mood, may have been a mere circumstance of the season.

Getting down to the practical side of affairs, a review of cash buying of apples in the Northwest in the past casts more light on future possibilities than any other analysis could. The practice is not new, nor has it been permanent or regular. It has been more prominent in some districts than others and there are unmistakable reasons for that. The absorption of that fact shows clearly why certain sections have been the central ground for the cash buyer, while others have been passed up by him. The whole question is not whether cash buying is going to continue in the same volume as was the case this year, but under what conditions the cash buyer may be expected hereafter in districts that knew little of him before.

The cash buyer comes to the Northwest for a distinct purpose. That is to secure what fruit his trade needs by personal selection of the varieties and qualities desired, and particularly to assure a standard grade and pack. Given the quality—grade and pack are equally vital to him, perhaps even more so, and physical condition of the fruit when shipped is just as essential. The accepted method of buying perishable commodities by the general trade is to do so on arrival at destination, and then only after inspection of the stock. The bulk of Northwest apple trading has always been done on that basis, and it is quite certain will also continue. The volume of cash buying has been and will be regulated by circumstances. They are two main ones. The first is the element of crop conditions in the Northwest and elsewhere. The second is the established demand for the apples of any special locality. That demand once strongly established, will of

its own accord insure the product being sought after by the trade whether on the ground for cash or by other sure means, but the cash buyer will always be in the minority, though there will always be a certain number of them on the ground of their own chosen sections. Uniformity and dependability is the key to the whole situation.

Between 1910 and 1914 inclusive cash buying decreased rather than increased in proportion to the increasing crops. From 1915 onward there has been a material increase in this method of trading and a great part of this increase has taken place in the Wenatchee districts. This circumstance pretty well sums up all there need be said in the way of argument, whether cash buying is to be a common feature in all districts in the future. The occasion for Wenatchee securing the greatest amount of the outside cash buying trade is a simple one. Wenatchee established in 1915 a standard grade and pack which was very rigid in details. Inspection at time of shipment was a part of the system. The thorough manner in which grade and pack conditions were observed, and as a matter of fact enforced, attracted special attention from the trade, and to this progressive action may be attributed the inauguration of the great amount of cash buying which has been done there in recent seasons. The result likewise brought sharp competition on the ground by a large element of cash buying trade and today Wenatchee enjoys the reputation of being the principal stamping ground of the cash buyer in the Northwest every season.

Development of grade and pack conditions is the prime factor responsible for increased selling for cash, to a no less degree than it is responsible for the wide trade the Northwest boxed apple commands. Grading and pack rigidly carried out, dependable from year to year, never deteriorating but always seeking improvement, stands foremost and almost singly in the list of conditions that have made the Northwest apple indispensable in so many markets at the present time. So long as the Northwest apple is kept up through proper orchard methods, to their well-known standards of excellence in appearance and physical value, so long will they be in demand as these elements are proof against the competition they must encounter everywhere. But where the grade and pack are as dependable as the best quality and appearance of the fruit itself, and the trade knows of that staple dependability then just as sure will the fruit be specifically sought out by the trade, and cash buying to some degree at least will displace some of the other legitimate methods of trading, even though that degree may fluctuate from time to time according to circumstances.

The grade and pack rules of Washington, closely allied with inspection by horticultural officers of that state at time of shipment, have accomplished material progress since inaugurated. Look at the difference between cash buying in the Washington sections since these grading rules and inspection were established, and the conditions existing previously, and the result is clear cut. Then let us consider that though the parent of the Northwest apple industry Oregon has no state grading rules. Nothing approaching even a standard set of rules applies throughout the state, with the exception that Hood River pretty closely follows one basis, and we can understand why the cash buyer prefers to get his supplies elsewhere.

No representative of the legitimate fruit trade of the country cares to buy apples, especially at shipping point for cash, which are not put up in conformity with grade schedules, with which he is

acquainted and upon which he can depend. Both the grower and the trade are equally interested in grading rules and better still in grading laws, because of the protection they offer to both parties. If the idea is harbored in any source that because the cash buyer stepped in some of the Oregon districts this season, he established an inflexible precedent, and may be looked for every year hereafter with unflinching regularity, that idea may be speedily dismissed so long as the present lack of standard grading rules continues. The terms "extra fancy," "fancy" and "choice" without a definite basis to go by, mean nothing. With a recognized grading rule they mean quite a bit more. With a state grade law, properly enforced, the Oregon boxed apple business as a whole will be immediately established. With state inspection supporting a lawful grade rule as a basic feature, demand will come to the grower through the various channels of trade, and with due appreciation of the cash buyer, what he represents and what he needs he will, with far less invitation than in the past, be a familiar figure in our midst.

INTERESTING FACTS ABOUT THE EVERGREEN BLACKBERRY.

By Ira Hutchings, Manager Brownsville Canning Co., Brownsville, Ore.

A great many of you will well remember that only a few years ago the Evergreen blackberry was just starting throughout our glorious state in a very few places. As nearly as the writer remembers, the first Evergreen blackberry grown in the state of Oregon was about the year 1887 or 1888; but, since that time, as we all well know, this berry has spread widely over this state and for several years in the past has been what the farmers term a "pest." As it roots and grows very easily almost everywhere throughout the western part of our state, the man who is raising sheep or goats or even cattle finds this plant has, to a certain extent, destroyed a great portion of pasture land, and we also find it has gotten root along fences and has kept spreading until it has occupied a great space of ground.

These berries had become so plentiful among us that we condemned them as being "no good" for the following reason: that, when we often find ourselves with a great plenty of one variety of produce of any description, we are soon tired of it. But we find in recent years that our friend W. H. Paulhamus, of the Puyallup and Sumner, Washington, Fruit Growers' Association, apparently got the first idea of canning these berries and started the industry in the Puyallup valley, at the same time urging growers of small fruits in that pleasant little valley to plant and cultivate this, the so hated Evergreen blackberry and we sat back and said to Mr. Paulhamus: "All right, Paulhamus, you go ahead and if you make a success of this we will come in;" and to our surprise he did make a success of the Evergreen blackberry. The demand grew to such an extent that Mr. Paulhamus was unable to supply the demand. Of course, this being the case we have all begun to reach out and grasp for these berries and today we find ourselves in this position: Every canner in Western Oregon and Washington is clamoring for all of these berries that it is possible to secure. We have even gone to the extreme in the past year of paying as much as 9 cents per pound for these berries delivered at the factory and the demand through the eastern states for this particular berry

has also grown, that it seems that we cannot anywhere near supply the market. I have known these berries to sell, in gallon cans, packed simply in water, as high as \$11 per dozen wholesale. Think of 92 cents per gallon for these berries! It seems almost prohibitive, yet I find the majority of the Evergreen berries sold for the 1918 pack at about \$8.50 to \$9 per dozen; orders having been taken early in the season.

Now we find ourselves offering inducements to the farmers and growers of small fruits to grow this berry, and after we have induced someone to undertake the growing and he has harvested a crop or two this grower seems fairly well satisfied with the results. I remember quite well of having a talk with a gentleman near Woodburn, Oregon, who has three-fourths of an acre of Evergreen berries, bearing and in good condition; he told me that from this small area of ground he picked and delivered to the Oregon Packing Company, of Salem, six tons of fruit. This was during the year 1917 at which time he received 4½ cents per pound for his berries.

On several occasions when I had the opportunity of talking to the growers I received the information that the usual crop produced per acre averages about eight tons; and in every instance where I talked with the growers they seemed to be fairly well satisfied with results. For this reason I do not hesitate to urge our growers and producers of berries to plant and cultivate this particular berry. I see no reason why the market should not continue at fairly good prices on this berry, as our experience teaches us that it is the only berry that can be packed in water and yet be solid and firm in the cans the same as jelly. This particular point is interesting to the baking trade, especially in the East, where they claim they can get from one to 1½ more pies from a can of these particular berries than is possible from any other. For the reasons as stated above, the Evergreens pack extremely solid and the buyer is not having to pay the enormous freight rates on water, and gets a good solid pack berry.

Now, as to growing these berries. I would advise the planting of them in rows not closer than eight feet between each row; and as to the distance between the hills in the rows, our experience has taught us that they should not be closer than ten feet, thus giving the vines a chance to train on the wire five to six feet each way. We also find the right way of training these berries is carried on in about the same manner as the handling of the Loganberries. The posts should not be placed over thirty feet apart on account of the extreme weight of vines and fruit during the bearing season. I also find growers differ as to the position of the wires; some prefer one directly above the other and the top wire about four feet from the ground and the lower wire about three feet, while others prefer the two wires parallel with each other at about 3½ to 4 feet high and about 10 to 12 inches apart with cleats to lay the vines upon.

As stated before in this paper, I firmly believe the grower that undertakes to grow and handle this berry will reap results.

At a meeting of the Northwest Cannery Association, held in Salem on November 25th, it was estimated that about \$700,000 was paid the Oregon people for these berries during the past season.

EXPERIMENTS WITH NITRATE OF SODA AS A FERTILIZER FOR ORCHARDS IN THE HOOD RIVER VALLEY, OREGON.

By Gordon G. Brown, Horticulturist, Agricultural Experiment Station, Hood River, Oregon.

Owing to the fact that a great deal of our attention at Hood River has been centered upon the problem of maintaining the vigor and productivity of bearing apple trees by the use of nitrate of soda, I take pleasure in reviewing some of our recent observations, hoping that such suggestions may be made as will have wide application. Two years ago I had the pleasure of addressing this society upon this subject reviewing data as obtained to date. Our problem then was to observe results obtained in orchards which had previous to such applications been in a declining state as evidenced by a decided lack of vigor and production. Such unsatisfactory conditions obtained because of lack of irrigation or cover crops.

Under the stimulating influences of irrigation, cover crops and nitrate of soda, the conditions enumerated have in most cases been entirely or at least very largely overcome. Response from the use of two successive annual applications in early March of five or six pounds nitrate per tree was at once very satisfactory in that trees quickly regained their lost balance. Vigor as expressed in terminal growth and leaf development exceeded that of unfertilized trees conspicuously. The percentage of fruit set doubled and trebled in many instances while larger yields of better fruit were in proportion. The first application of such fertilizer was accompanied in very few instances by undesirable results. Second and third applications successively in larger amounts, however, brought to the fore very important questions relative to its future use. Such problems as the following readily suggested themselves: Leguminous shade crops such as alfalfa or clover having been established in the orchard what relation do they bear to the use of nitrate or similar artificial fertilizer? Since alfalfa usually occupies the ground for many years as contrasted with clover, a crop ordinarily turned under for green manure after its second or third season's growth and accompanied later by clean cultivation the relation of nitrate to each crop becomes a distinct one in either case. The problem is still further complicated in that it must, at Hood River, be studied with reference to two or more varieties—Spitzenbergs and Newtowns, each representing different growing and producing habits. We are interested in knowing: Can nitrate insure us large and regular crops of good quality and may the alternate bearing habits of these varieties be influenced and to what extent? These are but few of the more important factors on which information is desired. In dealing with some of these points I shall aim to avoid details in order to be as brief as possible.

Before proceeding further it will be desirable to state briefly the natural handicaps under which we are working. We have stated that both of these varieties are more or less given to alternate bearing. We find that with our Newtowns and Spitzenbergs a close relation exists between previous yields and the percentage of blossoms setting fruit during the subsequent year. We have closely checked upon many different blocks and find the higher the percentage of fruit set the

lower the yields the previous year, or stating the proposition inversely the higher the yields this year the lower the percentage of fruit set next year. Again, as might be surmised smallest yields for the year in which percentages set are taken are associated with smallest percentages set and vice versa. It appears, therefore, from what has been said that, on an average, the capacity of both varieties to set and bear fruit is definitely limited. The data collected point out that the natural tendency is that should the tree bear very heavily one year the following year is one of reaction the degree of which is greatly influenced by the quantity of fruit borne during the previous year. The grower of these varieties should keep in mind these natural limitations and govern his orchard practices accordingly. Naturally, this fact bears an important relation to the character and extent of pruning, thinning, etc.

Relation of Soil Culture to Bloom.—We have noted briefly what some of the natural limitations are under which the grower works in dealing with these varieties. Let us see what influence soil culture may exert upon tree performance. The grower readily appreciates the importance of a full bloom. Some are able, assuming a normal season, to make a rough estimate thus early in the year what final yields will be. All will agree that we not only want a tree well filled with blossoms but we want it every year. Further, we would prefer having trees distribute the bloom evenly from year to year rather than in alternate periods of extremely heavy and extremely light bloom. Such an arrangement saves in thinning costs, gives higher average yields and is more satisfactory from many standpoints.

Can nitrate influence the tree in this respect? May the average degree of bloom shown by the individual tree from year to year be increased and to what extent may the well-known habit of Spitzenbergs in wide fluctuation be modified? With this point in mind I have kept individual tree records during the past three years. For purposes of comparison the degree of full bloom exhibited by the individual tree has been classified on a percentage basis as follows: 100 per cent, 50 per cent, 20 per cent, 5 per cent, and zero per cent. Briefly, Spitzenbergs receiving two applications of nitrate during the past three years, previous to which lack of irrigation or cover crops prevailed, show considerable differences over trees not fertilized. In the former case trees showed an average bloom of 77 per cent for three years versus only 64 per cent for the unfertilized trees. There appears to be but slight differences in this respect as between trees receiving two successive annual applications of nitrate and those receiving two applications but with one intervening year during which no fertilizer was applied. Trees receiving as high as seven pounds nitrate per tree show slightly better averages in degree of bloom than those receiving only five or three pounds per tree. Please keep in mind that trees thus referred to were being rapidly transferred from a state of low vitality and production by repeated applications of nitrate which under more normal conditions would not be justified. Furthermore, although clover has been growing between the trees during the past three years it has not yet been turned under. Let us study these trees further. We have seen that the average degree of bloom for three years differed materially. What have the individual trees been doing? To what extent has the tendency to light bloom one year and heavy the next been overcome? Briefly, trees receiving the seven-pound applications show a maximum average variation of 57 per cent; those five pounds, 66 per cent; those three pounds, 70 per cent; while the unfertilized

trees show as much as 81 per cent. What of the minimum variation? Trees receiving seven pounds show but 17 per cent; those five pounds, 45 per cent; those three pounds, 65 per cent versus 66 per cent for the unfertilized trees. Putting the proposition in another way; although heavily nitrated trees have varied as much as 57 per cent they have also approached within 17 per cent of zero per cent variation, the assumed ideal. On the other hand unfertilized trees although showing as high as 81 per cent maximum variation have never come closer than 66 per cent of the ideal or a difference of 49 per cent in this regard in favor of the heavily nitrated trees.

Let us study blooming habits in two other orchards both of which are now more typical of Hood River conditions. We will call one the clover sod orchard and the other the alfalfa orchard since the former had clover turned under as a green manure in the spring of 1916 and the other has had alfalfa continuously since the spring of 1915. Both orchards, with the exception of the check trees in each case received nitrate in the springs of 1914 and 1915 after which it was decided that no further applications were necessary. This was especially true where clover was turned under in that all trees whether fertilized or not became extremely vigorous. On an average there are little practical differences between any of the plats in either orchard regardless of whether nitrate had been applied or not. Nor does the general average for one orchard as compared with the other differ materially. It would seem to indicate that where trees are of moderate vigor or above there is a point beyond which trees cannot go even though given additional nitrate. This was further indicated in 1918 when two of the previously nitrated plats received a third application. However, as has been pointed out for the first orchards referred to nitrate has exerted a steady influence on bloom from year to year, there being differences of as much as 24 per cent for the clover sod, 18.6 per cent for the alfalfa orchards in variation, in favor of the fertilized blocks.

We are interested further in knowing how efficient the tree may be in making full use of the amount of bloom available from year to year. There are a number of ways by which this may be measured but the grower wants to know how yields are influenced since this is the real measure of success. In dealing with this subject let us again study the first two orchards referred to; those having been brought under the influence of nitrate for the first time in 1916 and where clover has not yet been turned under. Here, higher average yields are associated with heaviest applications put on during the first two years of the experiment rather than with plats receiving similar amounts but with one intervening year during which no fertilizer was applied. For instance, with Spitzenbergs, two successive annual applications of seven pounds nitrate per tree gave a three-year average of 12.6 loose boxes per tree versus only 8.5 boxes for trees receiving similar amounts but with the intervening year. With Newtowns a similar relation holds in that 11.4 boxes were secured in the former case versus only 3.8 for the latter.

These differences are due not so much to the amount of bloom appearing in the different blocks but to the fact that the former made more effective use of the bloom than the latter. Were we to compare yields from the standpoint of one equivalent percentage of bloom, say 100 per cent, we should find differences are marked in favor of the heavier applications. Under these special conditions, namely, trees much lacking in vitality and productive power due to lack of cover

crops and irrigation there is no question but that trees are able to utilize heavy applications of nitrate at least for the first two years after which the need of additional fertilizer will vary according to subsequent soil treatment, irrigation, and vigor of tree. The grower will be interested in knowing further that in the orchard where clover has been turned under and in the other where alfalfa has been growing for several years nitrated plats gave increased yields not so much because of better bloom on an average but because greatly increased efficiency of the tree to set its fruit and produce larger sizes.

The importance of knowing when to apply nitrate is obvious. When nitrate work was started at Hood River in 1914 it was observed that trees receiving a late application did not make much response until nearly the end of the same growing season. Such applications did not appear to materially influence the set of fruit that year. In 1917 a number of experiments bearing upon this point were performed. For the work, 14-year-old Spitzenbergs and Newtowns were chosen. Owing to the lack of previous irrigation and clean cultural methods over a protracted period the trees were badly devitalized and in need of artificial stimulation of this kind. Each variety was divided into five different plats each of which received 3.5 pounds of nitrate per tree. However, each plat represented applications two weeks apart ranging in dates from March 6 to May 7 when first and last applications were made. Percentages of fruit set were taken July 25 after the so-called "June drop" was past. It will be recalled that the blossom season in 1917 was extremely late. As may be expected, fruit continued to drop after this date but the percentages given bear a fairly close relation to yields secured. Newtowns receiving the early application of nitrate not only showed better foliage during the early season but 50.1 per cent of the blossoms set fruit. Percentages for the other tests ranging in order of application are 46.4 per cent, 42.5 per cent; (no record), and only 32.2 per cent for those trees fertilized May 7. Spitzenbergs also showed better-colored foliage where receiving early applications. The first trees to receive nitrate show 43.6 per cent set. The other plats show 46.9 per cent, 34.1 per cent, 33.6 per cent, and 21.2 per cent, respectively, the last figure being associated with trees fertilized May 7. The economic importance of early applications in both cases is thus quite evident especially in point of yields. The early fertilized Newtowns averaged 7.9 and Spitzenbergs 10.8 loose boxes per tree versus only 2.2 and 1.2 boxes for late applications.

Quality of Fruit.—The grower who uses nitrate on Spitzenbergs or other colored varieties finds greatest difficulty in securing both size and good color of fruit. Since clover has been turned under in one of the orchards studied there has been much evidence of over-stimulation especially where nitrate was also used. However, it is fair to say that heavy pruning and irrigation have also been contributing factors. These are the points which the grower himself must work out under his own conditions. On light soils one may use both nitrate and manurial crops with comparative safety and in many cases it may be necessary but where heavy soils prevail extreme caution is urged in their use. Here, again, the grower must decide how much in the way of color he can afford to sacrifice in order to secure increased size and incidentally increased yields. With Newtowns, of course, the problem is comparatively simple since the trees are capable of receiving fairly heavy nitrogenous stimulus from time to time and profit from the experience in heavy crops and large-sized fruit. On the other hand it appears that the long continued use of alfalfa as a permanent shade

crop is more compatible with results sought. This crop seems to exert a steadying influence in avoiding extremes in tree growth and lends itself to good red color but often sizes run small. It seems clear that on many soils trees in alfalfa can be with profit further stimulated with nitrate or similar nitrogenous fertilizer. Here, again, the question of soils plays an important part. On the heavier types one must be very careful not only in the use of nitrate but also with reference to irrigation, pruning, or cultivation.

Alfalfa in Orchards.—By special request I am appending before closing a few further remarks regarding the growing of alfalfa in our orchards. In my judgment there is no intercrop for the orchard which has so much to commend it as this one. It produces an immense mass of organic matter both above and below ground. It is unsurpassed as a soil renovator. It breaks up hard-pan and permits of soil aeration. It is stated on good authority that the New Jersey Experiment Station has found that the amounts of plant food gathered by a test acre of alfalfa in two years were equivalent in nitrogen to 2500 pounds of nitrate of soda, in phosphoric acid to 600 pounds of bone black superphosphate, and in potash to 1200 pounds of muriate of potash.

That alfalfa is filling the bill at Hood River is emphasized by the fact that in most orchards it is now well established. I believe, however, that many mistakes are being made in handling this crop. In the first place it is often sown upon a poor seedbed in that weeds or perennial grasses have not been properly suppressed or the ground has not been properly worked. The result is often a poor stand which in its shady and unnatural environment soon becomes weakened and lacking in effectiveness. Such plants are shallow-rooted and cannot possibly exert the beneficial influence provided by vigorous deep-rooted plants. The possibility of stimulating alfalfa growth as well as tree growth by good annual discing or renovating is often overlooked by the grower. There are places in Hood River Valley where hogs have been allowed to pasture on this crop and at the same time cultivation and ample irrigation have been withheld. The pasturing in itself is a commendable thing and often highly profitable, but when accompanied by the other conditions just enumerated the ground becomes hard and impervious in which trees, no matter how gifted by nature, cannot produce profitable crops.

The profitable use of land plaster or sulphur as a fertilizer for this intercrop is also often overlooked to the ultimate disadvantage of the grower. Oftentimes the fruit grower in cutting two or three crops of hay forgets all about his trees. The practice is often carried to the point where it takes keen observation to determine whether he is engaged in hay growing or fruit growing or both. The presence of a shade crop seems to have a certain psychological effect. The office of farm management of the United States Department of Agriculture found in some eastern apple sections the tendency was to neglect certain phases of orcharding where clean cultivation has been dispensed with. The practice of cutting hay in the orchard is entirely commendable, but where water is withheld or not available results are disastrous. While it is true that, where this crop is allowed to grow up and fall down without cutting, practically no more irrigation is required than where clean cultivation is practiced, this idea does not obtain where hay is made. In closing, therefore, let me urge that where alfalfa is expected to exert its best influence keep it vigorous and free from weeds by fertilization when necessary and by thorough annual cultivation. If hay is wanted don't be afraid to cut it for fear of

robbing the trees but be sure to give it (as well as the trees) the required moisture. When thus kept at its best, the grower may expect excellent returns from his trees.

SOME COMPARATIVE RESULTS IN CONTROLLING CODLING MOTH AND APPLE SCAB WITH DUST, SPRAY GUN AND ROD.

By Leroy Childs, Entomologist and Plant Pathologist, Hood River Branch Experiment Station.

Spraying for the control of the insect pests and plant diseases of our various orchard enterprises is one of the most laborious and at the same time costly practice pertaining to fruit growing in most sections. The apple particularly is subject to the attack of many pests of widely different life habits which demand the use of a variety of materials that control may be effected. The application of this variety of materials often means the necessity of applying numerous applications in the orchard each season. To the average orchardist of medium to large holdings the time element involved in spraying practices is the all important fact, or rather than the cost of materials. This time factor, together with the recent shortage and high cost of orchard labor has led to much activity in seeking out more rapid and at the same time equally effective methods of applying spray. The familiar three horse power sprayer and 12-foot rods when used in competent hands has been productive of good results in the control of our various troubles in the apple orchard. Nevertheless, in the face of six or eight applications a season this protection was usually accomplished in orchards of 20 acres and larger at the expense of some other orchard practice of nearly equal importance when looking into the future demands of the plantation.

The most promising outcome of investigations relative to the reduction of this time element in spraying has been the development of the dusting method (the use of insecticides and fungicides in the form of dust) and the spray gun. The latter adaptable to the old power sprayer or much more preferably to be used on a machine developing much more horse power than is at present generally used.

Of the two methods the dusting system is the older. Experimental work has been under way in the apple orchards of the East (notably New York state) for six or eight years. Reports from this section as to all around usefulness and effectiveness are more or less contradictory. Some investigators and growers are very enthusiastic in the praise of the system; others are much less so, even to condemning it altogether.

The writer has had the opportunity to test out the dusting method for the control of codling moth and apple scab during the past three seasons, 1916, 1917 and 1918. Two types of standard power dusters have been available for the work and extensive tests have been carried out under typical orchard conditions in the Hood River Valley.

From the standpoint of scab control 1916 proved to be the only year during which scab was sufficiently prevalent to enable the drawing of any reliable figures. That was a very favorable year for scab development, rainy, cold weather prevailing throughout spring and early summer. The fungus was held well in check on the dusted

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block, six applications of very finely ground sulfur being used. This was the first season of the dusting investigations in this section and it was deemed wise to first determine whether there was merit in the system from the standpoint of actual control—hence the keeping of the trees well coated with a fungicide during the long wet spring and early summer. In justice to the effectiveness of the dust it must be said that very good control of the disease was obtained. The results obtained compared very favorably with those obtained in a nearby lime sulfur block to which four applications of lime sulfur spray had been given. The unsprayed check trees developed 60.22 per cent infection while the dusted and sprayed blocks developed but 4.25 per cent and 2.65 per cent, respectively. A peculiar spray injury developed in the orchard during that season in the form of a calyx end rot. This injury was very much more pronounced in the dusted than in the sprayed block—perhaps brought about through the use of extra applications—amounting to 32.03 per cent as compared to 14 per cent on the sprayed trees. This particular type of injury was quite prevalent throughout the valley in 1916 and was probably intensified by unfavorable weather conditions which prevailed that season. One of the most striking features in comparing the sprayed and dusted trees, one with the other, was their foliage condition during the early summer. There is no doubt but that continued use of lime sulfur during the early season retards foliage development through burning and in some instances defoliation of the early appearing leaves. On the dusted trees no such injury occurred and the trees obtained their maximum full foliage fully three weeks earlier than the sprayed trees. In the fall the dusted trees turned yellow much earlier than the sprayed trees seemingly to indicate that their functioning was completed that much earlier than the sprayed trees. These trees have been dusted continuously for three years but regardless of this foliage condition there seems to be no difference in the general vigor and fruit bearing qualities of the sprayed and dusted trees.

Scab developed sufficiently in but one of the experimental orchards in 1917 to enable the drawing of any definite conclusions from the standpoint of scab control. The infection existing at harvest time on the unsprayed check trees amounted to 24.21 per cent. In the dust block the material was applied four times and in an adjoining lime sulfur block the spray was applied three times, the last application being omitted due to the fact that sulfur injury was feared on account of existing hot weather. The action of this material under such conditions being thoroughly established. Very good control of scab was obtained in both experimental plots. The lime sulfur again leading slightly with but .75 per cent scab infected fruit; .95 per cent infection developed on the dusted trees. The last application of sulfur dust caused a typical sulfur injury to the fruit of about .7 per cent; on the sprayed trees one-half of 1 per cent occurred. This indicates clearly that sulfur dust along with other sulfur compounds cannot be safely used on apple trees at times when hot weather can be expected. In 1918 no scab developed on the unsprayed, dusted and sprayed trees on account of unfavorable weather conditions (from the standpoint of the life habits of the fungus) in any of the experimental orchards with a result no further data from the experimental standpoint was obtained.

The information procured from the standpoint of codling moth control during the past three years is also more or less irregular. Years that are favorable for scab development are usually unfavorable for the development of the codling moth. The information obtained in 1916 was practically nil. Generally speaking but one generation of the worms appeared in the Hood River Valley that year owing to cold weather that prevailed practically all summer. During that season at harvest time but 1.2 per cent infestation was present on the unsprayed trees at the time the fruit was picked. (The first brood infestation was not checked, apples from which dropped and decayed.) On the dusted block an infestation of 1.9 per cent, or more than that observed on the dusted trees, was recorded while no worms were found on the sprayed trees. These percentages are so small as to be within that allowed for experimental error and cannot be considered as reliable.

In 1917 dusting work was continued in three different orchards. This season proved a good one for codling moth development, worms continuing active right up to picking time. The results obtained, however, in the final analysis are to a considerable degree contradictory. As indicated by the degree of infestation in the different orchards on the unsprayed check trees the crop of overwintering worms was quite variable. During the season in checking up the worm injury both stings and actually wormy apples were tabulated, giving as a result total worm injury. In one orchard the unsprayed trees developed 72.56 per cent worm injury, 54.49 per cent of the fruit being actually wormy and the balance stings. The fruit on the dusted trees, which was given six applications of arsenate of lead, developed a total worm injury of 44.05 per cent—8.99 per cent of which was actually wormy. In the sprayer block 14.87 per cent occurred; of which but 1.62 per cent contained living worms or apples in which they had entered. The dusting in this orchard was very carefully done by the writer—as was the case of all of the dusting work—and the results seem to indicate that the dust is much less effective where there is present a severe infestation with which to contend. In another orchard the check trees developed 41.34 per cent infestation with 24.07 per cent actually wormy. The dusted trees developed 24.73 per cent injury with 6.48 per cent actually wormy. On the sprayed trees in this orchard 8.93 per cent worm injured fruit was found of which but 1.83 per cent were fruits in which worms had entered. The average orchardist would not consider control of this degree on the part of the dust sufficiently effective to warrant its use. In the third experimental orchard during 1917 the infestation was very light; the check trees developing 6.8 per cent injury of which only 2.71 per cent were actually wormy. This loss was reduced to 2.34 in the dust area while the adjoining sprayed trees developed worm injury to the extent of 3.27.

In 1918 the dusting work was continued in but two orchards; the last two above described. In neither orchard was the presence of worms excessive. The fruit on the unsprayed check trees in one orchard developed 16.85 per cent worm injury (stings and wormy fruit) while on the dusted and sprayed trees 5.17 and 4.6 per cent respectively, occurred. In the second orchard 21 per cent occurred on the unsprayed trees while a loss of 4.92 and 1.14 per cent occurred on the dusted and sprayed trees. Control for 1918 then could be considered very satisfactory from the standpoint of both methods.

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In summarizing the results of the three years' work, it was observed, with the exception of one orchard, during one season the control obtained with the dust must be considered quite effective, though in but one or two instances did the results equal that obtained by the liquid.

Careful records have been kept relative to comparative costs of operation and materials from the standpoint of dust versus liquid. In the case of liquid applications some figures are available with reference to the use of spray gun and spray rod. A detailed account of cost records will not be presented in this paper. In summarizing it might be said that records were taken on three acre units, trees upon which were 14 years of age. As an example of this in 1917 six applications of spray were used to control apple scab and codling moth. In some of the applications the lime sulfur—or dust sulfur—and arsenate of lead were used separately and at other times in combination. The complete record shows that from the standpoint of cash outlay to the grower the comparative costs are about on a par—the dusting method being slightly more costly. It was found that it took two men 36½ hours to spray three acres six times with rods while the same acreage was dusted with the same crew and team in eight hours. On the face of figures submitted it would then appear, taking all things into consideration especially the time element, that the dusting system had the edge on the liquid method. The 1917 figures, however, were obtained before the spray gun came into use in the Hood River section. The figures that have been submitted, however, do not give the various factors that have to be taken into consideration in applying a good coat of dust—and herein lies the one great factor which makes its use impracticable under Hood River conditions. This all important factor is the uncontrollable wind. Wind, and to be more explicit, a very slight breeze, paralyzes the dusting method. It not only makes the accomplishment of good work impracticable but impossible. In employing the dusting method for pest control the air is considered the carrier. The dust is thrown with force into this theoretically quiet medium and so thrown covers the undersurfaces of the fruit and foliage. In hovering and slowly settling the upper surfaces are coated. With conditions exactly right a wonderful coating can be given a tree in all of its parts, a coating which has remarkable adhesive qualities. With a light breeze blowing—and this means light in its strictest sense—the properties involving the carrying qualities are greatly impaired. Instead of the materials naturally hovering over the tree as is the case in quiet atmosphere, a large percentage of the minute particles quickly pass by the fruit and foliage a large percentage of which is lost. Only those particles which actually strike surfaces—and perhaps not all of them—stick. The result is a loss of a large percentage of the materials used and an incomplete and ineffective coating. Some control might be obtained under these conditions but we have to contend with more than a light breeze during a greater portion of our spraying season. Ours is a real breeze and in some sections in fact might be called a wind. With a breeze of considerable magnitude blowing, effective work is absolutely prohibited. The trees cannot be reached for more than half their heights and the material that is used passes by and out of the orchard with the speed of an express train, taking no time to alight upon fruit or foliage. In Hood River during a greater part of the spraying season our atmospheric conditions are inclined to be windy. This condition existing often weeks

at a time with only a let-up usually very early in the morning. The dust was applied in practically all of the writer's experimental plots between 4 and 6 o'clock in the morning and even at this hour the work quite often had to be postponed to a more favorable day. After 8 o'clock in the morning it can safely be stated that there would be too much air current present at Hood River to permit effective work with dust.

Several orchardists in this section possess power dusters. I have noticed that practically all of them have dusted under weather conditions that could not be called favorable. During the past fall countings of fruit were made in a number of these orchards. Though no scab was present—a condition which was general—the losses resulting from worm infestations were excessive ranging from 15 to 45 per cent. Most of these growers look now with more or less disfavor upon this method of insect control. There is nothing magic about applying dust. If it does not cover the tree each time that it is used, control of a given trouble cannot be obtained. Our unfavorable weather conditions do not tend to assist the grower along these lines and many are inclined to dust when the weather is not right and let it go at that. This practice can only result disastrously.

The fact that the use of dust is not adaptable to the control of all of our orchard pests makes its use in the average orchard impracticable. The possession of a duster increases the overhead and the average orchardist cannot support much more than he is doing at the present time. Perhaps I have condemned this system—very meritorious—in many respects, excessively. It, however, is not adapted to the average Western orchard and the only real purpose that I can see for it is as an auxiliary to the liquid method in orchards of large acreage. Occasionally conditions arise that demand a quick application of spray and under these conditions the duster would come in handy provided, of course, existing weather conditions would permit favorable work.

As an Eastern entomologist has stated "the dusting method would have died a'bornin," had the spray gun and high powered sprayer appeared earlier. I believe that his judgment is sound in this respect. We have not had time to test out the gun under all conditions but preliminary work seems to indicate that it will in a large degree fill the bill. This is particularly true of the new 10 horse power, four cylinder sprayer that is becoming popular in the Hood River Valley. This machine is capable of maintaining three guns at a minimum pressure of 250 pounds. Several growers operate their machines in this manner, one man riding on top. The machine passes up and down each row, making necessary only a moment's stop for each two trees. The spraying of a large acreage per day is readily accomplished. Figures for the 1918 work not all available at the present time, however, from data in hand two men on this high power sprayer can cut their time in two and do the work much more easily than they could with the 12-foot rods and small outfit.

In some cases the old three and 3½ horse power outfits were found capable of handling two guns. A little more than a third of the time was saved as compared to the time used with rods. This was also accomplished with much less effort on the part of the rodmen. In other words the appearance of the spray gun has in a large measure taken the sting out of spraying, making easy work of what used to be

